

National College of Ireland
MSc Learning Technologies
2005/2006

DISSERTATION

**Putty in Their Hands:
Case Studies on Claymation in Two Irish Classes**

MARY O'CARROLL

Student Number: 00043943

ocarroll.mary@gmail.com



**National
College of
Ireland**

I hereby certify that this material, which I now submit for assessment for the programme of study leading to the award of Master of Science in Learning Technologies, is entirely my own work and has not been taken from the work of others, save and to the extent that such work has been cited and acknowledged within the text of my work.

Signed: Mary O'Connell

Date: 19.05.06

Student Number: 00043943

Acknowledgements

Education is an admirable thing. But it is well to remember from time to time that nothing that is worth knowing can be taught. Oscar Wilde.

A few maxims for the instruction of the over-educated (Saturday Review).

I express my gratitude to my supervisor Dr Eugene O'Loughlin, lecturer Dr Stephan Weibelzahl and all the library staff at NCI for their efforts over the past months; special recognition goes to Dr Conor Galvin of UCD for sharing his knowledge about information and communication technology in Irish schools and his specialist interest in qualitative research methods; a go raibh míle maith agat to Clifford Brown at the Digital Hub for his single-handed efforts at spreading Claymation projects in schools and for his help and advice. This thesis would not have been possible without the co-operation of the two teachers Liz Jones at Scoil Treasa Naofa and Breandán Ó Móráin at St Patrick's Cathedral Grammar School, as well as to the pupils and students who made the two wonderful animations and kindly permitted me to study their initiatives all the way through from January last. I also acknowledge the OECD for kind use of the PISA report and the ICT survey. Thanks to all fellow warriors in the 2005/2006 MScLT class – Ken Wickstone, Neil O'Sullivan, Ger O'Donovan, Damien Doheny, Clement McGann; Michael Mooney, Eddie Collins-Hughes and Fu Rao. In appreciation of Lloyd Gorman and Jon Lee for their morale boosting efforts and especially Jon's picture desk tips and a big thank you to Marie Creed for her help at the final hurdle with layout and design!

Table of Contents

Abstract.....	6
1. Introduction.....	8
1.1 Literature Review.....	11
1.1.1 Schools & ICT: Innovative Practices	11
1.1.2 ICTs in Schools Internationally.....	19
1.1.3 Ireland, ICTs & Schools.....	25
1.1.4 ICTs & Children.....	29
1.1.5 ICTs, Intelligence & Constructivism.....	33
1.2 Hypothesis/Research Question	39
2. Methodology.....	40
2.1 Background to the Case Studies.....	41
3. Findings.....	46
3.1 Case Study A.....	47
3.2 Case Study B.....	51
3.3 Pupils' Survey Findings.....	56
3.4 Teachers' Survey Findings.....	58
3.5 Transition Year Students' Survey Findings	69
3.6 Comparison of OECD and Transition Year Survey Findings	80

4.	Discussion of Findings.....	89
4.1	Case Study A.....	89
4.2	Case Study B.....	89
4.3	Pupils' Survey.....	90
4.4	Teachers' Survey.....	90
4.5	Transition Year Students' & OECD Survey.....	92
5.	Future Perspectives.....	96
	References.....	100
	Appendices.....	109
	Appendix 1.....	109
	Appendix 2.....	110
	Appendix 3.....	114
	CD ROM.....	Inside Back Cover

Abstract

This research set out to find out about an Information and Communication Technology (ICT) project called Claymation. Using the case study method; backed up by surveys, it looks at the reasons why two classes in two school(s) deployed Claymation and what impact that had. It found that a Claymation initiative instigated by the Digital Hub in Dublin's south inner city in 2004/2005 spread from a pilot project in two schools, comprising eight classes, to 10 schools and 17 classes in 2006. The dissertation investigated two of those classes, one that was participating for its 2nd time (13 primary school pupils) and the other (17 transition year students) taking part for the first time in 2006. On May 8th both schools attended a film festival where their animations were showcased. Both teachers said they saw merit in Claymation as a constructive experience for their students. Both sets of students were happy with their short animations. One setback was both projects took longer to complete than was first anticipated, this was partly due to scheduled holidays and other school events that took priority. It had been anticipated that the projects would take two weeks when they started in late January but were only completed at the start of May. The survey of teachers (10 participated) reveals that the majority have access to computing at home but rarely use ICT facilities for school-related work. The teachers don't see technology making any noticeable inroads into schools within the next five years and many still lack the basic hardware and software for ICT use in class. Thus their pupils use very little ICTs at school though many pupils have a range technology at home. The Claymation experience was the only ICT project the primary school pupils encountered during the school year though the school has a computer room and equipment. The secondary school students infrequently use computers at school and they also participated in an ICT project using digital camerawork during the year. The transition year students' survey reveals they mainly access computers at home and they are very confident about their ICT

abilities. In comparison with a similar survey of 15-year-olds in OECD countries published in 2005 the transition year students performed at higher levels in 19 out of 23 skill areas but they use computers less frequently than participants in the OECD surveys. Interviews and surveys with principals, parents and teachers were planned to back up the case studies but did not take place. Ten teachers participated in the surveys but there were no opportunities to interview the teachers given their busy schedules and the extra workload of the Claymation projects.

1. Introduction

This dissertation investigates two Information and Communication Technology (ICT) projects based on the use of Tech4Learning's Claymation toolkit in two Irish schools, one a primary and the other a secondary school. Claymation involves the combination of clay models, artwork, storyboards, digital camera equipment and Videoblender software to make digital animations. The Digital Hub in Dublin's inner city initiated a series of ICT pilot scheme in schools as part of the Diageo Liberties Learning Initiative with a view to acquainting children and the wider community to a range of digital media projects including Claymation. In 2005 a pilot project was conducted in two inner city schools, Scoil Treasa Naofa in Petrie Road and Basin Lane primary school both in Dublin 8, using the Claymation kit and substituting plasticine for clay. The Digital Hub organised professional development training workshops for teachers taking part in the pilot. It also provided technical and professional back-up when they started the process in their respective schools. The pupils used Claymation to create short digital animations in the Irish language curriculum area. The pilot project was completed before the end of summer 2005 and a showcase of the work was held at the Digital Hub in May. Following the success in making eight animated films the Digital Hub decided to re-run and expand the animation project in the school year 2005/2006. Two of the schools taking part in the second pilot provide the case study material for this dissertation - the 5th class in Scoil Treasa Naofa primary school and a second-level transition year class in St Patrick's Cathedral Grammar School, Patrick St, Dublin 8. Both schools were selected for this research after consultation with the Digital Hub and agreed to take part. Due to time constraints, the novelty of the initiatives in Ireland, concerns for teacher workload and ethical considerations about researching students and children under 15, the case study method - backed up by surveys - was selected.

This dissertation aims to document these unique phenomena as well as the processes the schools/classes undertook during the animations. It aims to unearth the reasons behind the decision to deploy Claymation/animations as an ICT project by the schools and focus on the outcomes in terms of curriculum, classroom practices and ICTs in schools. The research looks at the projects' timescales and the special supports in the form of training offered by the Digital Hub to assess the factors in the success or otherwise of the projects. It enquires about the prospect of Claymation/animations being extended to other areas of the curriculum and to find out what lessons can be learned in relation to digital media use in education. While copies of the finished animation products abound until now the animation processes in the schools were not documented. This research aims to rectify that omission so that a testimony exists. Qualitative and quantitative methods were selected to provide subjective and objective accounts of the key participants' reflections, actions and reactions on the initiatives and to inform the case study observations. While it was planned to survey the opinions of the principals and parents, along with the student and teacher participants, with a view to obtaining their perspectives on the process, access to the principals and parents proved more elusive than even the teachers. The research on both projects began in late January and early February in Scoil Treasa and St Patrick's respectively and continued until after Easter 2006. As part of the overall investigation an interview with Cliff Brown, project co-ordinator at the Digital Hub, was also factored into the research.

The literature review discusses a number of issues that affect the professionals using ICTs - teachers, trainee teachers and principals. It gives a flavour of a select number of ICT projects in countries that have employed and documented ICTs before moving onto issues about ICT use in an Irish context. It reflects on debates that have arisen concerning children and their use of ICTs/computing at home and at school. It ends with a discussion on the educational theory of constructivism and the theory of multiple intelligences which informs the thinking behind Claymation.

The hypothesis/research question outlines the main areas of concern connected with the research question and the methodology section discusses the choice of the educational case study approach and the use of qualitative and quantitative data to support it. The case study narratives are presented as are the survey findings from the primary school pupils, the teachers, the transition year students and the comparative findings from the transition year survey and data from the Organisation for Economic Co-operation and Development's Programme for International Student Assessment (PISA) report *Are Students Ready for a Technology –Rich World? What PISA Studies Tell Us* (2005).

The discussion of findings details the key points arising from the research results (qualitative and quantitative) while in the future perspectives recommendations for further research and future directions based on the literature review and the case study research, are presented. All instruments used and data results are provided in the appendix and/or accompanying CD for objective appraisal purposes.

1.1 Literature Review

General Background

The case studies and related surveys in this dissertation present a picture of two ICT animation projects in an Irish primary and post-primary school. The literature review concerns itself with ICTs in schools and the educational theory influencing their usage.

It first (1.1.1) investigates schools and ICT innovative practices with reference to the professionals - teachers, student teachers and school leaders/principals. It then (1.1.2) takes a snapshot look at ICT projects internationally before (1.1.3) focussing in on ICT issues in Ireland/Irish schools, offering both a global and local backdrop to the two case studies under enquiry.

Children are a key concern in educational systems and (1.1.4) four deals with some of the debates about ICTs in relation to them. The last section (1.1.5) highlights the clash of ideas about human intelligence and cognition that informs thinking about educational practices to discuss and concepts about constructivist theory, multiple intelligences and Claymation.

1.1.1 Schools & ICT: Innovative Practices

"Innovation is a delicate plant, which thrives in a favourable climate. It grows in stages," Hargreaves (2003, p. 33) says and it begins with identifying the need for change, generating ideas which can be put to the test, and eventually those ideas either get taken up or dropped. "There are in short, three key phases in innovation or knowledge creation: the generation of the idea, its application in practice, and its transfer into widespread adoption," Hargreaves says. This

section of the literature review looks at current thinking about ICT in education as well as the outcomes from innovative educational practices.

Innovative practices & teachers

Lim & Khine (2006) say a general assumption about ICT in schools is that once the hardware and software appear the way is paved for ICT integration. However they argue that one of the key determinants about the application of ICT in education is the teacher and “first and second order barriers”. First order barriers are issues extrinsic to teachers such as lack of access to technological hardware, software and connectivity; lack of time to plan ICT integration in teaching/learning, lack of training for teachers and time for teachers to become adept at technology as well as inadequate technical back-up. Second-order barriers are theoretical or philosophical in nature and concern teachers’ beliefs about ICT in education, the role of ICT in teaching and learning and other personal issues.

Redmond & Brown (2004) show that educators’ history applying ICTs in the classrooms over the last 25 years has been mixed. They found that ICT pioneers forge ahead into unmapped areas with their ideas and practices while “the middle and late adopters are finding it difficult to continue without knowing their final destination”. The result is the digital divide between the early and late adopters of ICT integration is widening. Redmond & Brown suggest teachers need a “fearless” attitude in the use of ICTs and to work in an environment which encourages them to take risk. Risk-taking cannot take place if teachers “live in a blame culture” with top-down government initiatives, schools inspection reports, league tables and naming and shaming failing schools, Hargreaves (pg 33, 2003). “The process of knowledge creation involves risk-taking: there cannot be innovation that is risk-free. The climate that is most inimical to innovation is a blame culture, which both discourages the creation of new knowledge and undermines the courage needed to take the process through the high-risk phase of application and transfer.”

ICT practices in the classrooms are divided by Harris (2002) into two main categories: innovations which promote the involvement of others outside the classroom and innovations which change interactions within the classroom. Harris found teachers had to be willing to change their existing practices because in several cases students became more independent and supported each other; they developed new communication and social skills and improved their self-directed study skills as a result of ICT.

Teachers should move the education debate away from ICT and information literacy issues and questions about whether ICT should be used in teaching and learning, Fetherston (2004). Instead the author says classroom practices need to move to more inclusive reasons for changing schools, among them meeting individual learner needs, adapting to the diverse learning community, connecting with digital students to prepare them for the knowledge society and reducing school sizes are some reasons advanced. Evidence based on the Coalition Campus Project (Darling-Hammond, 2002) in New York where two large schools broke up into 11 smaller schools showed that attendances improved, incident rates dropped, reading and writing levels improved and rates of graduation and college going went up after the school reduced in size.

However not all see it that way. Stoll (2000) yearns for a wider discussion on the claims and promises of ICT and is suspicious of those using it as a "Trojan mouse" to slip in reforms or radical plans. The self-confessed computer contrarian said: "I'm furious to watch our schools sold down the river of technology." In Stoll's view a good school needs no computers, no multimedia and that the enjoyment of scholarship should have nothing to do with making learning fun. Stoll vents his rage at people who use the ICT innovation to alter schools. "Tell the public that we're bringing computers into the schools; meanwhile sneak in problem-based learning, collaborative learning, or constructivist education. Reformers see technology as a back door through which they'll shake

up traditional classrooms. At best it's an expensive – if disingenuous – way to reform our schools. At worst it's outright fraud; selling a hidden agenda on the promise that technology will improve our schools.”

Hargreaves (2003, pp. 44-46) says much has been written about the sharing of good practice by educators and the dissemination of best practice but “our knowledge about how this might best be done is frighteningly slight. Hargreaves advances a reason why there is a superficial knowledge of what most practitioners actually do in schools: it is because teachers work alone and their work is largely hidden so the judgement that a teacher's practice is good derives less from observation and more from reputation among peers. “In short much that is said about 'good practice' is based on mere opinion or unsubstantiated assertion rather than robust evidence about 'what works' in particular circumstances,” Hargreaves says.

Innovative practices & trainee teachers

“It is not merely schools that must be transformed, but some of the other institutions that serve schools and indeed exist only because of them. Their relationships also have to be transformed so that these different communities learn with and from one another. One such is the academic community in higher education that is responsible for teacher training and most educational research. The direction of reform advocated here would require a transformation of academic educationalists and researchers, in theory and practice.” (Hargreaves, 2003, p. 67).

Delargey (2003) said feedback from student teachers undertaking the Intel Teach to the Future course said it was worth doing as it would encourage the use of technology in classrooms. Delargey found that student teachers were exposed to a variety of teaching aids which they said increased pupil motivation and improved their own ICT skills; facilitated the sharing of ideas among peers and

felt would benefit them in their future careers. The study noted that some schools did not have facilities that allowed them to put their learning into practice while others said they needed more time to help train the pupils on software packages.

Murphy & Greenwood (1998) identified three main obstacles that limited ICT uptake by trainee teachers: student access to computers, the ICT policy adopted by teacher training providers and a lack of enthusiasm for the use of ICT on teaching practice. A second study (Murphy 2000) of course attendees in 1999/2000 showed that while the overall sample appeared more competent and confident in the use of ICT than the previous study, female and younger students lagged behind their male and older peers.

Student teachers' classroom-based ICT experiences can be enhanced by using knowledge building applications in their college learning that they can replicate in the classroom, Elliott (2003). He says the exercise works best when the experiences are "authentic" and "assessable" at college level as well as during teaching practice. Elliott says learning is a complex process "in cognitively demanding or new situations, interactivity in the form of scaffolding afforded by more expert participants provides specific cognitive supports to assist understanding and knowledge building."

Trainee teachers in an Appalachian study also reflected on a scaffolded and scaled approach to using technology. Lennex (2003) found trainees were required to collaborate with K-12 (primary and secondary school) teachers in the construction, delivery, and evaluation of their unit plans with tasks structured so as to require the trainees to be able to locate technology, identify software, and secure support if needed for implementation. According to Lennex's findings none reported having trouble with locating basic support or equipment or software for their lessons or using technology available in schools. Lennex notes that nearly all of the trainees said their cooperating teachers took notes from them on how to use the equipment.

A plan was devised for trainee teachers of ICT to pair with other curriculum specialists on a PGCE course in Britain to teach pupils technological skills and introduce ICTs across a range of subjects, Selinger (2000). The plan saw trainee teachers allocated to schools to work in pairs in specific curriculum areas using ICTs innovatively in the preparation of lesson plans. Selinger found that the school-based experience made the trainees much more aware of ICT potential while trainees also felt that working within an ICT department alone would not have been as beneficial.

Redmond & Albion (2002) used computer-mediated communication (CMC) with student teachers to complete minor group projects using mailing lists and newsgroups. The activities provided a context for the CMC experience but, Redmond & Albion found the tasks set could have taken place in face-to-face meetings. When they opted for an online guest to provide focus and direct CMC conversations trainee teachers reported seeing ICTs and their integration as important issues though some had difficulty articulating what ICT integration could mean in practice.

Postgraduate students studying to become teachers of either Modern Foreign Languages (MFL) and Information and Communication Technology (ICT) in Britain jointly developed ICT-based/MFL teaching resources and then used them to teach in secondary schools. (Chatterton & Willan, 2002). The study found a number of ICT and MFL students were paired for their school placements to allow students take college practices into a real setting. The authors said in some schools the work was affected by pre-existing relationships between the departments, ICT infrastructure in the school and by the attitude of some of the staff to ICT. Chatterton & Willan found that MFL students on placement were being actively used as change agents within language departments: teachers started to see the students as a useful resource to help to update their own skills.

Holmes et al. (2001) established there was a marked contrast between students' learning and their attitude to learning at undergraduate and masters' level, with the latter a more positive experience than the first. One reason they advanced was the size of the class and another the use of ICT, especially a class e-mail list which the authors say contributed significantly to the development of a learning community. Holmes et al said email allowed students engage in anytime, anywhere communication with their peers and helped learning to take place in a scaffolded environment of both peer support and support from lecturers. The authors discovered teaching strategies were significantly different from those at undergraduate level, where the didactic model was the norm as because on the course 'the lecturer as learner and learner as lecturer' model was used.

The literature covering trainee teachers shows there is innovation going on in teacher education colleges and universities, however, some are querying the emphasis on ICTs over traditional educational values (Redmond & Albion 2002) but others report positive engagement with technology (Delargey 2003) and (Murphy 2000). In relation to the transfer of new ICT ideas and practices Lennex (2003) and Chatterton & Willan (2002) reported that students on teaching practice said class teachers were actively noting down tips and using the opportunity to upgrade their own ICT skills.

Innovative practices & leaders/principals

The schools most likely to welcome innovation are those where two conditions can be met, Hargreaves (2000, p.38). "First their headteachers are convinced that complacency is dangerous and that many things could and should be done better...Secondly, the schools must be ones where teachers can be provided with the necessary opportunities to innovate."

Comber & Lawson (2003) lament the fact that the role of school leadership in integrating ICT effectively into the curriculum has been under-researched. Some

of the developmental needs of principals in relation to ICT identified by them were:

- The sustainability of provision in a rapidly changing technological environment;
- The integration of ICT into classroom practice with limited computer resources;
- External forces (for example, inspection regimes) that worked against the development of good subject-based practice with ICT;
- The recruitment and retention of technical staff with sufficient technological expertise and teaching staff with appropriate pedagogical skills with ICT;
- The management and recording of student ICT skills.

In previous work Comber et al (2002) explored the personnel factors that led to 'the integrative school', a school where ICT was used to promote learning across all curriculum areas in a seamless way. Lawson & Comber said one of the main characteristics of the integrative school was the presence of a head teacher/principal who promoted and developed a school ethos that embraced technological change and managed its implementation in educationally effective ways.

Otto & Albion (2004) found principals viewed ICT as an enhancement of current teaching approaches rather than a platform for new approaches to teaching and learning. While the principals in their study saw the potential in technology, the authors found the principals' limited use of it in administrative roles influenced their views on ICT uses in the classroom. Otto & Albion said traditional views of knowledge and a preference for the teaching of basic skills as a foundation for other learning caused the principals to see ICT as an add-on to current practices. They argued that self-efficacy (Bandura, 1997), the belief that people can accomplish a particular behaviour to achieve a desired outcome, is the key factor in human agency. Otto & Albion said when the principals experienced difficulties in working with ICT their self-efficacy (confidence) was reduced and when they

were able, alone or in collaboration, to achieve some measure of success it increased.

1.1.2 ICTs in Schools Internationally

Asian countries that topped the PISA 2000 league are not complacent about education and are ready to innovate, Hargreaves (2003, p.20) wrote: "In East Asia it is known that radical innovation in the way organisations work can transform an industry. They are now thinking hard about how educational organisations might engage in innovation to nurture the creativity on which their future success as a nation may well depend."

The following tour through a number of countries will give a snapshot of the innovations and some of the key issues being raised about ICTs in education around the globe. Karpati (2003) said the first phase of the computerisation campaign in Hungary, 1990-98, was characterised by investment in infrastructure. In the second phase, 1998-2002, the training of teachers was the focus. Karpati said reform-oriented institutions with dedicated and highly-trained staff were the first to engage in ICT reforms. Karpati found that schools in Hungary that were cutting-edge, innovative institutions *before* ICT had been introduced made the most out of ICT and schools with ICT infrastructure played an important role in the introduction of other educational reforms as those schools equipped with ICT were more motivated to upgrade their teaching culture than those left out of the computerisation campaign. Karpati says the ICT initiative acted as "*Trojan horses* – smuggling an army of new methods into the school fortresses". A practice Stoll (2000) rails against and downgrades to the status of a "*Trojan mouse*".

As Lim & Khine (2006) argued about investment in education in Singapore the Hungarian findings indicate that infrastructure and student competence of themselves do not contribute to the success of the reforms as much as teacher

attitudes. Toots & Laanpere (2004) said the first survey of ICT use in Estonian schools also focused on first order barriers after the completion of a 1996 computerisation programme called Tiger Leap. At the end of 2000 the final report outlined the achieved results:

- Computers in all 560 primary and secondary schools (31.5 students per computer on average)
- 75% of all schools have internet access (63% via direct connection, the rest dial-up)
- 65% of all 17,000 first level and second level teachers passed basic 40-hour computer literacy courses
- 61 educational software packages were purchased centrally by TLF for schools
- 39 original educational software packages produced with financial support from TLF and several large-scale development projects carried out including two web portals.

The follow-up phase Toots & Laanpere said would focus on teachers and competency standards, establishing virtual schools and other initiatives.

Daly (2001) viewed the role of ICTs useful at a number of levels but particularly assistive technology applications which involved pupils with physical disabilities in mainstream education. Daly said the though projects were potentially successful barriers within the wider education system militated against the adoption of their methodology. Where research fits into the Irish education system is not clear as there are no clear formal or otherwise mechanisms to communicate the findings to the wider educational community Mullen (2000) found.

Gobbo & Torrebruno (2003) looked at two ICT projects that experimented with ICT in the Italian education system and showed ICT as a tool can increase

disabled people's opportunities in the school system and encourage others to think about how to make efforts to use to use ICT for students with disabilities.

Icelandic researchers Hjartarson & Jakobsdottir (2003) found that while policy makers, curricula, school leadership and exceptional teacher pioneers seem to unite "in a relatively enthusiastic and often euphoric approach to ICT as a tool for teaching and learning," the majority of teachers seem unmoved and hesitant. As schools in Iceland were becoming ICT equipped and there was a growing understanding of the need for technical assistance and financial means to support change Hjartarson & Jakobsdottir found there were few examples of schools where ICT had been taken on as a tool for teaching and learning in regular classes, over a range of disciplines and by a majority of teachers on an everyday basis.

The role and nature of ICT in education encompasses optimistic rhetoric and pessimistic rhetoric with the optimists having held sway in recent years, say Nicol & Watson (2003). Optimistic rhetoric was the force behind the release of billions of pounds to fund the use of ICT in the education including the UK government's £900 million National Grid for Learning (DfES 2002), they argue, saying the UK government's interim evaluation (DfES 2002) shows the role and nature of ICT in schools is problematic, with minimal involvement of ICT across the curriculum in the everyday teaching of pupils. Nicol & Watson say a re-examination of basic principles is required "to map ICT on to existing practices and to extend them in terms of the needs of both teachers and pupils in an *evolutionary* and not *revolutionary* strategy of optimist rhetoric advocates".

Loveless, Taylor & Millwood (2001) ask how do educators approach research into the creative uses of digital technologies and evaluate what's learned from the progression of practice and understanding through experiences. Loveless et al say "it is timely to consider the role of research in providing both a stimulus for

new work and a space for reflection and critique” to provide evidence that can inform decisions by practitioners and funders of future ICT initiatives?

Research by Kylämä & Silander (2001) at the ICT Learning Centre in Helsinki University showed the only way to make changes in the pedagogical practices of teacher's work was to influence the whole school community in a collaborative way. Kylama & Silander developed practices for in-service training that included collaborative learning, research-based learning, computer-assisted team work and distance learning on the net. They found the use of open learning environments, OLEs, facilitated the transformation of learning.

Hakkarainen et al (2001) said research into teachers who use ICT actively showed they had a more mature insight into the use of ICT in education and generally had more sophisticated pedagogical thinking. Hakkarainen et al found teachers who valued ICT more than others as a tool for collaborative learning placed an emphasis on the active role of the learner in the information constructing process and shared beliefs that it is possible to develop human intelligence. Huovinen (2001) said the Finnish virtual university and polytechnic, based on an educational model that accommodates lifelong-learning and continuing professional education of teachers, was not only a technical question but also a pedagogical one. A key issue, Huovinen found, was the standardisation of educational technology and copyright.

A study by Orhun (2004) in Turkey found that the extent of the implementation of ICT innovation in secondary schools in Izmir was limited, five years after its initiation, and found not all of the conditions that supported successful initiation were present at the state schools for a variety of reasons - including the fact that the projects were “top down” and were often quite hierarchical. By contrast, Orhun showed a private school that had a longer time to prepare for ICT implementation and a more co-operative culture fared better. Orhun argued that “a top down” approach was ineffective and that the community involved in the

change in the school needed to be as involved in the process as were the teachers in the private school.

Bratengeyer et al (2003) found Austria had three main types of activities to support eEducation: large-scale testing of Learning Management Systems (LMS); implementing notebooks in upper secondary schools; and applying quality assurance standards to schools and adult education centres by bringing quality assurance methods and management development practices from the world of business. Austria's next step concerns "eLearning clusters" or regional networks of schools using similar eLearning programmes, LMSs and authoring tools.

Dibbon (2003) also asks the question Hargreaves (2003) raises about spreading innovation - how can good educational projects and practices move beyond pockets of excellence to reach a wider audience? Dibbon investigated the Grassroots Program which funded innovative, internet-based, collaborative and interactive electronic learning projects in over 100 Canadian schools while setting out to spread innovation through the SchoolNet Network of Innovative Schools (NIS). The author demonstrated how the GrassRoots Program had a positive impact on the ability of NIS Schools to be innovative saying the leverage lay in an increased capacity for teacher professional learning; teacher technology skill development; student technology skill development; student employability skill development; access to teaching resources; leadership opportunities; and school growth and development.

Clifford & Friesen (2002) said providing professional development onsite and online through a professional development service called IO (Intelligence On-Line) assisted teachers to make changes to their professional practice as IO had classic content as well as tutorials "just in time, not just in case teachers might need the information six months down the lines". Clifford & Friesen said IO allowed teachers to collaborate with others, consult with world-class experts, and see powerful examples of what learning with technology could mean by being immersed in technology.

McFarlane (2001) finds there are at least three discourses influencing policies relating to ICT in schools and each centres on a significantly different view of the role of ICT, each has different implications for assessment and affects the ways that schools will manage access and usage and each has implications for learning outcomes and accreditation.

- ICT as a set of skills or competences as in the curriculum orders for IT
- ICT as a vehicle for teaching and learning as in the teacher training curriculum requirements for ICT in subject teaching
- ICT as an agent of change which impacts in a revolutionary way

McFarlane asks what are the key measures that judge the impact of ICT on educational standards and identifies as crucial the question "does the use of ICT support improvements in attainment, or does it in fact offer an alternative agenda which conflicts with the current standards agenda in fundamental ways?" What is required, McFarlane argues, is a break down of ICT applications, including teaching and learning and a theoretical proposition for the likely impact of each on attainment so the framework can inform research design.

Lim (2002) argues for a socio-cultural approach to the study of ICT in schools, rejecting the view that ICT can be studied in isolation or as a single variable in the learning environment. In Lim's socio-cultural theory ICT must be studied within the learning environment and the broader context in which it is situated. The theoretical framework is based on the activity system as a unit of analysis that is surrounded by different levels of ecological circles. Lim argues that by adopting the framework and addressing its limitations researchers would be able to study and document both the "successful" and "unsuccessful" integrations of ICT in schools with particular learning environments and their socio-cultural context (education system and society at large). Lim advances the idea that the approach would then generate a research agenda for the study of ICT that could inform policymakers, school administrators and teachers about how to take up

the opportunities and address the limitations of ICT and how to successfully integrate ICT in schools, specifically within their broader socio-cultural contexts.

Hargreaves (2003, p. 48) says "innovations and best practices do not spread naturally or easily either in the world of business or education" and the way to spread new practices is voluntarily through peers as in (Dibbon 2003) and (Clifford & Friesen 2002) in Canada, and (Hakkarainen et al 2001) and (Huovinen 2001) in Finland, Bratengeyer et al (2003) in Austria found. McFarlane (2001) and Lim (2002) argue for a theoretical model for appraising the use of ICTs in education in order to evaluate and spread the innovations.

1.1.3 Ireland, ICTs & Schools

Holmes, Fitzgibbon et al (2000) say the reason the Irish Government, through the aegis of Department of Education & Science (DES), launched the Schools IT 2000 initiative in November 1997 was due to the International Data Corporation's ranking of Ireland in the third division, position 23, in preparedness for the Information Age. Galvin (2002) attributes the call for action on ICT in schools to Brussels with its launch of an action plan in 1996 to support ICT initiatives in European Union member countries. Notwithstanding the exact drivers behind the Irish Government's IT 2000 policy framework for the integration of ICTs in first and second-level schools the policy had as its core objective (DES, 1997, pg 2-3) the putting in place of an infrastructure to ensure computer literacy in every pupil so they could equip themselves for the information society. Up to £107.92 million was earmarked for investment in integrating ICTs in schools (DES 2001) over the three years 2001-2003 with the Irish Government allocating the money specifically for ICT capital provision saying its purpose was for expanding access to, and use of internet technologies; further integrating ICTs into school curricula and the enhancement of teacher professional development (DES 2001). An analysis of the funding DES (2004) showed it had involved a direct state

*why all
this ICT?*

investment of €356 million, of which over €300 million was for expenditure on the development of ICTs through the provision of facilities and equipment.

The most recent review on primary school education (NCCA 2005), the curriculum review report, found that three-quarters (75%) of teachers reported using ICT to support the English curriculum but found ICT use in English was generally limited to typing up or transcribing children's written work with little use of ICT for research purposes or for creative uses. The review showed just over one-third (34.4%) of teachers reported using ICT in the Visual Arts Curriculum where it predominantly focused on using the internet to look at art and artists work and using software to design and printing cards, paint and colour.

Teachers see the curriculum, and particularly assessment requirements at second level, as not yet strong enough to make the integration of ICTs an imperative for schools (Freeman, 2001). Evidence of this is found in a survey of Irish post-primary teachers, (Mulkeen, 2000), where it is reported that just 29% of the teachers surveyed had used ICTs in teaching. Conway (2000) said: "IT 2000 underestimates the curricular scope of computer literacy and although it is not a curriculum document, the inattention to the curricular scope of ICT integration is problematic." Austin et al (2000, p. 88) argue that if ICTs are to have catalytic effect on classroom practice State policy must play a critical role in ensuring that curriculum and assessment systems adapt.

One of the positive effects of Schools IT 2000 in Ireland was a narrowing of the gap between the best-equipped schools and those with least equipment but in addition schools designated as disadvantaged received additional funds. (Mulkeen, 2000). By 1998 there was a marked increase in the level of access to ICTs in schools with 50% of primary schools reporting that pupils in third class made use of ICT rising to 86% by 2000 (Mulkeen, 2000) and in post primary schools 54% of students in second year had access to ICT in 1998, rising to 67% by 2000. The author said it showed Schools IT 2000 resulted in more equipment

and connectivity, high participation in training, increased teacher skill and increased usage in schools.

A recent department report (DES 2004) on ICT infrastructure in 2000/2001 and 2002/2003 shows the average pupil/computer ratios has reduced from 37:1 to just over 11:1 at primary level and from 16:1 to 9:1 at post primary level – a growth in numbers of computers in schools from 36,000 in 1998 to almost 85,000 in 2002.

The Schools IT 2000 initiative (Gavin, 2002) was “the biggest single investment in living memory in any educational initiative in Ireland: euro50.8m” and the follow-up three-year plan for 2001-2003 set aside euro109m for broadband connectivity and other matters. From their study Holmes et al (2000) conclude that while the use of ICTs in Irish schools expanded due to Schools IT 2000, its use within classrooms was largely confined to the ‘early adopter’ category and that severe challenges were in store for those attempting to spread the use of ICTs to the ‘late majority’. Holmes et al raise the question about learning outcomes and the circumstances likely to be beneficial and not only statistics about computer to pupil ratios and connectivity.

Holmes et al (2000) say the current classroom model is “largely a product of the industrial revolution” and that “earlier models of learning were much more tailored to individual learners” with an emphasis on high-level student tutor interaction. Holmes et al say new educational technologies give an opportunity to rethink educational relationships to building a community of learners with an emphasis on the community rather than the individual learner.

Sánchez et al (2001) says the field of ICTs in learning is still very much in a state of flux as researchers and practitioners are in the process of constructing knowledge about it and that “medium-scale, focused, ICT classroom interventions” offer an opportunity to put lessons learned into practice while

offering a test-bed for researchers to further knowledge in the discipline, they contend.

Galvin (2002, p.5) says the use of ICTs “has already begun to change to change the way we think about teaching and learning in Ireland, and even the nature of the teaching act.” However while arguing little is known about ICT in education, Galvin (2002, p.9) argues even less is known about how to manage change on the scale that is implied and says what Ireland needed was a school-centred initiative “which sought out ways of permeating ICT through the curriculum” but what was delivered was a government-endorsed initiative underpinned by private sector investment. Galvin says the Schools IT 2000 initiative, while a powerful vehicle for change in education ICT in Ireland, left in its wake a number of unfulfilled expectations and uncompleted activities.

Galvin (2002, p. 13-14) argues that replication of the Schools Integration Projects (SIPs) in Schools IT 2000 was an important part of the overall strategy and to do this documentation and evaluation of projects was needed. The study found day-to-day practicalities of running projects proved more time consuming for teachers than anticipated, lack of outside evaluative support hit them, lack of appreciation of the roles and functions of evaluation as well as uncertainty in the early days surrounding the roll-out of the projects were factors that affected documenting and researching all projects. “High tech” projects, Galvin & Mulkeen (2002, p. 152) argued, could prove amenable to replication “as they involve a relatively small investment” of tried and tested equipment whereas “high tech” projects were more expensive and technologically ambitious. High tech was defined as concerned with hardware, network solutions and such issues whereas high tech projects used “simpler” technology and had more focus on pedagogy.

Sánchez, Benson et al (2001) identify five stages in the uptake of ICTs in schools: Familiarisation; utilization; integration; re-orientation and evolution. They said there was “definite evidence” that some high-quality learning experiences

had occurred during a SIP in their study including children learning how films are created, students improving their oral and presentation skills; disadvantaged pupils developing their literacy and numeracy skills and general enthusiasm from children about using ICT in schools. Another positive spin-off, they noted, was inter and intra school relationships at primary level and interdepartmental co-operation at second level sharing pedagogical ideas and technical expertise.

Mulkeen (2000) found that integration of ICT in subject teaching at primary level was less of a problem than at second level, saying, while primary schools had less equipment they made more use of ICT in teaching, had higher levels of teacher skills and retained more after participating in projects. Hargreaves (2004, p. 14) also said "primary schools have shown great ingenuity in putting computers into regular classrooms" whereas secondary schools were limited by the traditional grammar of schooling with "its one-subject, one-teacher, one-class system is left intact".

1.1.4 ICTs & Children

The Alliance for Childhood in the USA published a report (2000) that claimed that the use of computers causes loss of wonder, impaired language and literacy, stunted imagination and poor concentration in children. It said children who use computers have little patience to study for long periods, copy work, lose contact with reality while ICT use also harms moral development. Abbott, Lachs & Williams (2001) back the report's case for developing creative skills during childhood but argue that creativity can not only sit alongside computers, it can be encouraged by them. Abbott et al say what is missing from the US report is any indication of why computers *should* inevitably stifle creativity and cause harm to children. The authors say activities with computers in UK classrooms do not prove that computers help children to be creative but show that it is *possible* for ICTs to do so.

The opposition to ICTs is similar to that that greeted by the introduction of television in education. Postman (2005) wrote about television: "My argument is limited to saying that a major new medium changes the structure of discourse, it does so by encouraging certain uses of the intellect, by favouring certain definitions of intelligence and wisdom, and by demanding a certain kind of content – in a phrase by creating new forms of truth-telling".

Children's learning outside school

Studies by McNicol, Ghelani & Nankivell (2002) show that much of children's learning takes place outside school, especially where ICT is involved as there were approximately seven times as many computers in homes in the UK as there were in schools in 2001. Home-based IT resources have implications for children's learning opportunities and the British Educational Communications and Technology Agency has claimed that children using a computer at home are likely to do better at schools (DfES 2001). McNicol, et al suggest: Providing ICT facilities in community locations, by having libraries share resources with health, leisure and school centres; they urge schools to open their libraries and ICT facilities in the morning and evening to allow for community access; make libraries more user friendly; get local businesses to support employees willing to mentor children; loan laptops to children and provide recycled computers for low-income families are other suggestions made.

ICT use at home is growing faster than in schools and educators must grapple with it, Wellington (2001) urges, because there are fundamental differences between learning in an institution – school, college etc, and ICT and home-based learning such as the lack of institutional constraints, conformity, staged outcomes, timetables and teacher control. Wellington points out that learning with ICTs can be characterised by personal empowerment, free access to information, flexible learning and other outcomes that home learning comes closer to with its

voluntary effort, free range and unstructured sequences with open-ended outcomes which will increasingly impact on schools.

Postman's son Neil (2005), in the introduction to the later edition of the book, said for television substitute the word computers. "The television style of learning is hostile to book learning and school learning, Sesame Street doesn't not encourage children to love school or anything about school it encourages them to love television....I believe the epistemology created by television not only is inferior to a print-based epistemology but is dangerous and absurdist." Stoll (2000) holds similar views: "It's easy to talk about computers' speed, memory and novelty. More difficult to grapple with the frustrations they generate, their costs (both obvious and indirect), and their side effects. Yet these downsides maybe more important than the over-hyped benefits. What's the cost when we adopt new technologies? Who's marginalized? What valuable things get trampled?"

Children and the digital divide

As the digital divide or digital dividend argument rages Stoll (2000) yearns for a wider discussion on the claims and promises of computing, arguing that a good school needs no computers, no multimedia and that the enjoyment of scholarship should have nothing to do with making learning fun. Riel & Schwarz (2002) describe how the Anaheim City School District tackled the problem of closing the digital divide by creating a Technology Learning Community (TLC) by engaging students, teachers, and principals of two schools, researchers from two universities, school and local librarians, and members of the community in a process of continual learning centered on technology. Riel & Schwarz employ a metaphor of a triangle where the width (access to technology in the school), slope (conceptual knowledge of the teacher), and depth (societal opportunities and access) of the digital divide to illustrate why it is not possible to close the digital divide with a single intervention. They say TLC project addressed out-of-school learning by forming a partnership with the public library, creating parent

courses for basic computer literacy, and developing after-school programmes for students using the same technology used in schools at several branches of the public library.

Litton (2002) found that St. Matthias High School in Downey, California created a *Vision for Technology*, a multi-year plan for technology updated annually and revised in consultation with a technology committee of school administrators, students, community representatives and higher education professionals. The study illustrates how in 1995, the school did not have a single computer but by 2001 the school had over 100 computers, purchased and donated, a server, digital cameras, and a satellite connection for the internet. Litton explained that all the teachers had a computer in their classrooms, were wired for the internet and had software appropriate for the teacher's content area as well as several labs for teacher and student use while students who decided to take the advanced level computer classes became technology leaders in the school.

Pearson & Swain (2001) show access to computers does not provide equitable learning environments. Findings from the literature they examined indicated three primary areas that influence the digital divide in the school system:

1. Frequency of use
2. The computer experience of students, and
3. Teachers' technology training for teachers

Pearson & Swain said teacher educators can have a positive influence on these areas: "We can make a difference in the digital divide in the school systems. We need to shift from merely examining the number of computers in a classroom or lab to focusing on how the technology is being used to enhance the learning environment."

Yelland & Lloyd's (2001) study supports previous data indicating major gender differences in ownership, use, and preferences of computers but they warn that if

educators ignore popular culture and computer/video games they risk exposing more of their products. The authors maintain the main issue would be the dispersion of the cultural curriculum outside the school to corporate non-educational interests.

1.1.5 ICTs, Intelligence & Constructivism

Late 20th century research into the mind, human intelligence and learning has augmented thinking on the subject through developments in a range of fields from artificial intelligence, psychology to neuroscience and education among others. Research indicates that intelligence is not a static structure that can be measured and meaningfully quantified, but an open, dynamic system that can continue to develop throughout life (Diamond, 1988). The Plasticity of the Brain theory argues that environmental conditions, interpersonal stimulation and the way in which individuals think and behave can change the body, brain and intelligence. The theory of Multiple Intelligences (MI), (Gardner 1983), offers a new framework for considering intelligence in children. Gardner determined that intelligence is a pluralistic phenomenon rather than a static, single type of intelligence. The psychologist defined intelligence as “the ability to solve problems in real life; the ability to generate new problems to solve, and the ability to make something or offer a service of value within one's culture”. The Harvard University professor of education identified eight distinct types of intelligences –

1. Verbal/Linguistic
2. Logical/Mathematical
3. Musical
4. Visual/Spatial
5. Body/Kinesthetic
6. Interpersonal
7. Intrapersonal and
8. Naturalistic

In contrast to MI theory is the theory of unitary intelligence, IQ, or 'g' for general intelligence. Binet (1905) developed the original intelligence quotient test which gives a ratio of mental age to chronological age, with 100 as average. In this approach intelligence is seen as a limited cognitive ability, determined genetically. Herrnstein & Murray (1994) raised controversy with their book *The Bell Curve* when its data backed claims that whites have, on average, higher IQs than blacks and other ethnic groupings tested in the USA. In 1994 in a letter to the *New York Times*, a group of 52 academics defended the research saying it was mainstream scientific evidence (Gottredson, 1994). They said not only could intelligence be measured but they could measure it quite well. Gardner (1995), in a critique of *The Bell Curve*, said the work conveyed the impression of intelligence as "an innate fact of life - unanalyzed and unanalyzable - as if it were hidden in a black box. Inside the box there is a single number, IQ, which determines vast social consequences."

Gardner (1993 p. 169) says when IQ tests and other assessment measures were first devised little attention was paid "to the underlying theory of intelligence". He advocates the creation of testing instruments that are 'intelligence fair' rather than those that only measure linguistic and logical-mathematical intelligences. A struggle is underway about the future of schools in the USA, Gardner (1993, pp.68-72) says. He defines it as one between the drive for "uniform schooling", based on what he says is "a fundamentally flawed view of human cognition - one that I call IQ-style thinking", and the individual-centered schooling. He says there are two reasons to support individual-centered schooling, one because individual learners have quite different minds from one another and two, no one individual nowadays can master the world's extant knowledge therefore "uniform" schooling – the notion that there is a basic set of competences and a core body of knowledge which every pupil is expected to master – is rendered irrelevant.

Constructivism & Claymation

Kolk (2002) says completing an animation using Claymation involves all of the multiple intelligences including linguistic: through storytelling and written narrative; logical mathematical: through the completion of several distinct steps, plans, sequences, budgeting for time and resources; spatial: through creating a storyboards or a visual map of the project; musical: by children creating an original soundtrack or editing sounds; kinaesthetic: through using clay characters, positioning characters for picture taking, building characters, sets and accessories; interpersonal: through teamwork; intrapersonal: through sharing experiences by keeping records and naturalistic: through examining patterns and processes as scenes and actions are made. Kolk says Claymation also is useful for promoting a number of skills the USA's SCANS report identified as necessary for children to learn for the future workplace including: creative thinking; decision making; problem solving; knowing how to learn and reasoning.

*Claymation
not explained*

Constructivist theory

Constructivist theory, built on the work of pioneer John Dewey (1938), argues that an individual learner actively "builds" knowledge and skills and that information exists within these built constructs rather than in the external environment. Huitt (2003) said while advocates of constructivism may differ about cognitive, social or communal forms they all agree that it is the individual's processing of stimuli from the environment and the resulting cognitive structures, that produce adaptive behavior, rather than the stimuli themselves. Piaget (1952) believed that the fundamental basis of learning was discovery. Bruner (2002) labeled learning an active, social process whereby students construct new ideas or concepts based on their current knowledge with the role of the instructor one where they should try and encourage students to discover principles by themselves.

Lev Vygotsky (1978) said social interaction plays a fundamental role in the development of cognition and an aspect of Vygotsky's theory is the idea that the potential for cognitive development depends upon the "zone of proximal development" (ZPD): a level of development attained when children engage in social behavior. Full development of the ZPD depends upon full social interaction. Bailey & Pransky (2005) criticize those who equate constructivism with a "universalised" pedagogy. They argue that is at odds with (Vygotsky, 1986) a view of learning as a profoundly cultural process. They warn that students from ethnic communities have their own learning traditions and preferences that may not align with the beliefs and values of a dominant American middle class constructivist culture.

Constructivist practices in classrooms

Stager (2001) says a Constructionist Learning Laboratory (CLL) set up by Seymour Papert in 1998 was a bottoms-up approach to the theoretical basis for constructivism and Papert's own application of it – constructionism. Stager says the learning was designed "to create a rich constructionist learning environment in which severely at-risk students are engaged in long-term projects based on personal interest, expertise and experience. Students use computational technologies, programmable LEGO and more traditional materials to construct knowledge through the act of constructing personally meaningful projects." Stager notes the CLL was conceived as a multi-aged, self-contained, interdisciplinary, computer-rich, learner-centred environment with no prescribed curriculum so that it could allow learners to create authentic rather than 'discovered' knowledge marrying radical school reform ideas about teaching and learning roles.

An application of constructivism with an emphasis on students constructing learning *for* as well as *with* others has been advanced by Holmes et al (2001) "What we argue for is a *communal constructivism* where students and teachers

are not simply engaged in developing their own information but actively involved in creating knowledge that will benefit other students. In this model students will not simply pass through a course like water through a sieve but instead leave their own imprint in the development of the course, their school or university, and ideally the discipline," the advocates of communal constructivism say. A challenge to communal constructivism says its key ideas are already contained in social constructivism (Pountney, Parr, & Whittaker 2002) and that the pedagogical strategies that communal constructivists champion are those that social constructivists also support (peer tutoring, collaborative learning etc) - but they say what the concept doesn't explain is *how* students learn. Pountney et al say communal constructivism raises the question as to whether it can help transform social constructivist educational theory into practice at ground level. Scrimshaw & Weber (2003) explain that social constructivism can be seen as an explanatory and descriptive theory of learning because its object of study is all learning and not pedagogic theory about how best to promote *good* learning. Scrimshaw & Weber argue that communal constructivism is best seen as a pedagogic theory concerned with researching and understanding *how good learning* can be brought about. Pountney & Aspden examined whether new educational technologies such as virtual learning environments (VLEs) warranted a new kind of educational theory such as communal constructivism, or whether they perhaps lured teachers into affordance (Gibson 1979/1986). Gibson said behaviour is afforded by the environment, and affordance is defined as the consequences it has on behaviour. Pountney & Aspden point out that VLEs and ICTs have their own attributes or affordances and their research shows there is little to suggest that the affordances of the VLE are guiding tutors to adopt practices that they would not otherwise use.

Keengwe & Hofmeister (2004) apply Ausubel's (1963) theory of meaningful learning to argue that concept maps are a way that allows instruction of material to learners of different prior knowledge. Learners pick up new concepts by constructing a network of concepts and adding to them to realise meaningful

learning. A constructivist initiative advanced by Kane (2002) is the WebKANEcts strategy for e-learning. Kane developed an artefact for IT skills by enabling learners compile learning objectives with content, context and IT assistance support to help learners complete college assignments. Ferguson (2002) says a constructivist classroom can use five ICT for collaborative learning projects. (1) Computer-Supported Intentional Learning (CSILE) models classrooms on research communities by using a collaborative learning environment and communal database within a multimedia environment; (2) CoVis, Learning Through Collaborative Visualization Project, allows students participate in authentic scientific processes using modified versions of scientists' tools; (3) The Computer Clubhouse is a model learning environment through which disadvantaged pupils work with ICT to develop computer-based projects based on their own ideas; (4). In the JASPER project students are presented with adventures that challenge them to solve complex problems, based on real-world situations and (5) a WebQuest, an inquiry-based activity in which some or all of the information that learners interact with comes from resources on the internet by tackling questions that prompt higher-level thinking. Ferguson says a WebQuest uses scaffolding, or prompting, to facilitate critical thinking.

Innovation: The bazaar versus the cathedral

Hargreaves (2003, pp. 55-57) promotes an idea that can provide a mechanism for linking theory and practice on ICTs in education. He says the culture that inspired the internet and open source can provide inspiration for educators to spread their innovations. He employs Raymond's (1999) metaphor of the cathedral and the bazaar. Raymond said the traditional construction of a cathedral consisted of a hierarchical culture of craftsmen building to a grand design whereas the bazaar is created by a community of people with different approaches. For Hargreaves the open source movement resembles more a sociological developmental model that educators could model to develop innovation.

1.2 Hypothesis/Research Question

Research is a systematic investigation to find answers to a problem (Blaxter et al 2002). The problem or research question asks did a collaborative, cross-curricular digital technology initiative based on Claymation integrate information and communication technologies (ICTs) for oral language learning/teaching in both classrooms? Why did the school deploy it for learning/teaching and what impact did the initiative have? The research question asks did a specific ICT intervention enhance classroom learning in a curriculum area by creating an animated resource and what were the key factors in this venture – collaboration, cross-curricular activity, digital technology, training workshops for teachers, whole school support for the initiative, parental curiosity? The research also investigates why the Claymation-based initiative was selected by the schools and what were the outcomes for the children, the teachers and the wider school community including principals and taking into account the role of Digital Hub personnel.

style

what exactly is
RB

2. Methodology

The method chosen for the research is that of the educational case study. Bassey (1999 p. 26) quotes Robert and Yin saying "the essence of a case study is inquiry in a real-life context as opposed to the contrived context of experiment or survey." The educational case study is an empirical study of a contemporary phenomenon in its real-life context is the conclusion and one that has gained increased ground as an acceptable strategy for educational research.

Bassey (1999 p. 58) defines an educational case study as an empirical enquiry which is:

1. Conducted within a localized boundary of space and time (i.e. a singularity)
2. into interesting aspects of an educational activity, or programme, or institution, or system
3. mainly in its natural context and within an ethic of respect for persons
4. in order to inform the judgements and decisions of practitioners or policy-makers
5. or of theoreticians who are working to these ends
6. in such a way that sufficient data are collected for the researcher to be able:
 - (a) to explore significant features of the case
 - (b) to create plausible interpretations of what is found
 - (c) to test for the trustworthiness of these interpretations
 - (d) to construct a worthwhile argument or story
 - (e) to relate the argument or story to any relevant research in the literature
 - (f) to convey convincingly to an audience this argument or story
 - (g) to provide an audit trail by which other researchers may validate or challenge the findings, or construct alternative arguments.

2.1 Background to the Case Studies

The two schools in this case study research are singularities participating in an ICT in education initiative in their own classroom boundary settings. They were scheduled to take place after the Christmas break in late January and before the Easter one (April 7th). The Claymation-based projects, while linked with the Diageo Liberties Learning Initiative were not Irish Department of Education and Science (DES)-led ICT, nor were the projects commonplace outside of a handful of individual schools. The case study method was selected to record these unique events, to detail how they came about and document what they entailed. The data collection was designed to look at the significant features of the cases and relate them to interpretations of the findings with a view to constructing a coherent argument about those findings that could lead to interest in the singularities by other practitioners or policymakers.

The case study method was selected as the schools, teachers and classes in the study are independent of the researcher. Ethical issues concerning the conduct of research on minors and the carrying out of experiments on the pupils were taken into account in the methodology selection. The advantages of case studies outlined by Blaxter et al (2002 p 73) are they can provide a rich seam of material:

1. They are strong in reality – they draw on people's experiences
2. They allow for generalisations from the specific to the general
3. They can show complexity of social life, can explore alternative meanings and interpretations
4. They provides data source for further research/analysis
5. They can be linked to action and contribute to changes in practice
6. They can be persuasive and accessible because they are close to people's experiences.

However the limitations are that the complexity of the data can make analysis difficult. It can also prove difficult not to lose sight of the whole due to the

interrelated links and it can be difficult to know where the context for the study begins and ends.

Blaxter (2002 p. 62) says the methods and methodologies used in research draw from three successive levels - families, approaches and techniques. These offer a way into the systematic investigation of the problem.

1. Research families: (a) quantitative or qualitative research; and (b) deskwork or fieldwork.
2. Research approaches: (a) action research, (b) case studies, (c) experiments and/or (d) surveys.
3. Research techniques: (a) documents, (b) interviews, (c) observation and/or (d) questionnaires.

This study was predominantly selected from the qualitative (with quantitative survey data) research family, employing a fieldwork strategy; the case study research approach was selected as the most suitable for both schools and a mix of research techniques including observation, interviews and questionnaires/surveys were chosen to aid the overall narrative. The goal of employing the three techniques was to aid triangulation of the data with subjective observations of the researcher complemented by interviews with the key actors, the two teachers and the Digital Hub's project co-ordinator, and standardised surveys of the key participants to elicit factual information and their views on the specific ICT initiative and ICT in education issues in general.

The dimensions of studies as defined by Yin (1993) are the number of cases, single or multiple, and the purpose of the study – exploratory, descriptive or explanatory – which further categorises the case study. The dimensions clarify further the purpose and nature of the methodology chosen in that this research is a multiple study of two cases that will provide material to compare and contrast as well as offer a descriptive dimension in words and pictures to inform the narrative.

Bassey (1999 p. 25) quotes Kemmis (1980) on the duties, responsibilities and opportunities of the case study researcher that illuminate and guide the process: "The imagination of the case and the invention of the study are cognitive and cultural processes; the case study worker's actions and his/her descriptions must be justified both in terms of the truth status of his/her findings and in terms of social accountability. Social science has the unique problem of treating others as objects for study; the unique problem in case study is in justifying to others why the researcher can be knowledgeable observer-participant who tell what s/he sees."

As Bassey points out the case study research must try to interpret what the different actors are doing and thinking about the case so that s/he can make a coherent report. To aid that process Kirkpatrick's (1994) four levels of evaluation (reactions, learning, transfer, results) and Bloom's (1956) taxonomy of the three domains of educational activities (knowledge, skills, attitude) were selected as pointers both for classroom observational activities and for the interviews with the teachers.

Qualitative methods:

Three major forms of data collection were selected:

- Observation
- Interviews
- Questionnaires (the open-ended questions)

Field research observation would be exploratory and open-ended, and the researcher was tasked to make extensive field trips between January and April and take notes in an observer-as-participant role (spending a limited amount of time "inside" the project while informing the participants they were being studied). The data recording would be by audio tape, written notes and pictures. Interviews

link meth.
to RG!

were scheduled with both individual teachers and questionnaires administered on paper and/or online to the principals to elicit school leaders' views, the teachers for their attitudes and opinions on ICT in education and both sets of students.

Kirkpatrick's four levels of evaluation were selected as a guide to the one-one-one interviews of the Claymation phenomenon while the observation of classes was guided by using Bloom's taxonomy of the three domains of educational activities.

Is this
training
at
all?

Quantitative methods:

Four surveys were devised and made available both online and in hardcopy for the participants.

1. Primary students' survey:

A teamwork rubric based on one found at the San Diego Unified School District's Patterns Project, Kimbrough elementary schools webquest units. It asks the children five questions about both their individual and group work in the Claymation sessions.

<http://projects.edtech.sandi.net/kimbrough/pilgrimlife/teamworkrubric.html>

and

www.surveymonkey.com/s.asp?u=386341911981

2. Teachers' survey:

The Teachers and Technology: A Snap-Shot Survey is taken from an in-service teachers' survey from the Texas Center for Educational Technology. The survey provides a snapshot of how prevalent technology is in education today and what educators believe about the technology. The Snapshot survey was developed by Norris and Solloway (1998). It asks census questions about teachers' access to computer at home and at school, teacher needs re ICT, beliefs about ICT and education, the length of time students and teachers use ICT for education and a rating on the stages of technology adoption based on instrumentation from

Christensen, R. (1997) Effect of technology integration education on the attitudes of teachers and their students.

<http://www.tcet.unt.edu/research/online/snapshot.htm>

and

www.surveymonkey.com/s.asp?u=706371911877

3. Transition year students:

This is an online survey based on the ICT Questionnaire in the report Are Students Ready for a Technology-Rich World? What PISA Studies Tell Us (OECD 2005. pp 84-86). It was conducted in 2003 among a similar age (15-year-olds) cohort of students to the transition year pupils and asks questions about technology availability, length of time using ICT tools, ratings of skill levels, key information providers and two questions about the Claymation process in the Irish school have been added. The OECD survey was selected because comparisons can be made with its findings.

www.surveymonkey.com/s.asp?u=375721912044

and

http://www.oecd.org/document/14/0,2340,en_2649_34515_36002382_1_1_1_1_00.html

3. Findings

3.1 Case Study A

3.2 Case Study B

3.3 Pupils' Survey Findings

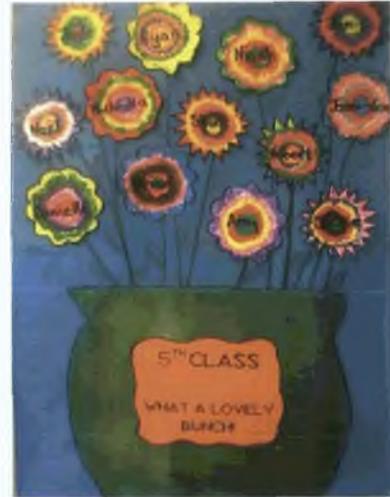
3.4 Teachers' Survey Findings

3.5 Transition Year Students' Survey Findings

3.6 Comparison of OECD & Transition Year Survey Findings

3.1 Case Study A: Scoil Treasa Naofa

The Claymation initiative at Scoil Treasa Naofa, involved 13 pupils aged 10-11 years in fifth class and their teacher Liz Jones. The school has 126 pupils, 11 teachers, two of whom are resource teachers and a principal. The school is located in a disadvantaged south inner city area. In 2004/05 a Claymation pilot project in the school involved six different classes, from senior infants (aged 5+) to fourth-class pupils (aged 9+). Clifford Brown of the Digital Hub approached the school, one of two in the Dublin 8 area, with a view to taking part in the pilot scheme. The principal in Scoil Treasa saw the ICT potential and decided to make it the flagship Irish language programme with six teachers and classes taking part.



Learning the language

“The principal’s thinking was that teaching Irish was a real trial, the pupils were learning very little, there was no fun in what they were doing. So he thought getting involved in the project would be exciting and stimulating and the children



Creating the artwork

would learn some Irish from it. It wouldn't be a huge amount but it would be Irish they wouldn't forget and they would have fun at it," Cliff says. A second set of projects commenced during the school year 2005/06 with five classes in Scoil Treasa alone taking part.

All the teachers participating in the pilot attended a three-day professional training workshop organised by the Digital Hub. They learned how to organise and make an animation while the National Council for Technology in Education (NCTE) paid for substitute teachers to replace them at work during the training.

The fifth class project started on January 25th 2006 and continued until Easter (April 12th) with the finishing touches added after the Easter holiday. The project consisted of five distinct sections, the story/Irish language learning element; the artwork; camerawork, editorial work and the post-production elements. The teacher selected a well-known Irish folklore story – an Bradán Feasa (the Salmon of Knowledge) as the basis for the animation. Five one-hour sessions were spent teaching elements of the folk tale, Irish language vocabulary and related activities to the pupils.



Model making

The second phase, storyboarding, modelling and the artwork for the set creation started in mid March and ended in early April. The teacher and pupils divided the story up into 15 scenes which they storyboarded on the class whiteboard. The pupils created characters using plasticine, including various versions of the two main characters for close-ups and zoom outs. They found imaginative ways to



Fionn Aongas in triplicate

make props using classroom art materials that included the depiction of a hurling match scene, a fire and spit scene for roasting the salmon, a trampoline and the other elements needed for the storyboard. They pupils worked in groups and individually enlisting the teacher's help only when necessary. "The kids were really good

at doing it," Liz Jones said. She described her role as "just supervisory" because the pupils "knew what to do" due to it being their second animation.

The third phase in mid-April involved camerawork which took place over a number of sessions with each pupil getting a chance to photograph specific scenes. When that was completed the editorial software was used to animate the pictures and the film was completed on April 28th. In early May the final post-production finishes of sound, titles etc were added. "The animation looks great," Liz Jones said. "The animation gives them insight into the technical world, gets them to use computers. Some would have computers at home but they are not used much, they ask me about burning CDs etc, they use them more to type up letters and for entertainment."



Shooting the scenes

Due to the school's involvement in the initial pilot project it had received two laptop computers, digital cameras and tripods as well as Claymation kits, all the technological tools necessary for the animation. "If we didn't do this animation they never would have them as they are not going to get it [ICT help] at home," Liz said. "We wouldn't have any of this without the Digital Hub." Computers had



Fionn and the Deer

been donated to the school and the computer room had been redeveloped when the school was refurbished last year but they were by then obsolete. “When we started animations we had no computers. The principal and the board of management bought six Dell computers which wouldn’t have

happened otherwise,” she said. “It’s fantastic, it’s given a push on ICTs in the school, we see the benefits and the kids love it.”

Liz said the initiative benefits the learning and teaching process. “It’s totally different, it’s very relaxed, the kids are up and about more, it’s not pen and paper stuff....it’s all oral and active. They really enjoy it once they get used to that method.” In May 2005 Scoil Treasa held an open day at the Digital Hub to showcase their six animations on a large screen. “This brought more parents to the school than before,” Cliff said. The principal attributed it [the attendance] to the pupils and the excitement the animations had generated. “They wanted parents to come and see the movies they had created,” Cliff said.

Animation created an extra workload for the teacher this year but it was worth it, Liz felt. “I enjoyed it this year, it takes a lot of time but it’s nice for them to have a finished product. Animation it is extra work but it is worth it. They take a lot of pride in it,” she said.



The Crew

3.2 Case Study B: St Patrick's Cathedral Grammar School



Model making

The transition year class at St Patrick's Cathedral Grammar School joined the Claymation schools' project for the first time in 2006. Teacher Brendán Ó Móráin pioneered the animation with the 17-strong group in fourth year. The project started in late January and continued until after Easter. However, notwithstanding a series of schoolbreaks the primary school also experienced during this term – mid term break in February, St Patrick's weekend in March and

Easter in mid April – the transition year class had other scheduling issues to contend with. Most weeks they had only a 40-minute period on Wednesday and the odd double-class period to complete the project. They also went on a two-week work-experience placement and rehearsed and performed in a school musical over another two-week period.

From the outset of the students devised their own storyline for the animation based loosely on the Little Red Riding Hood tale adding “a Shrek-like twist in it”, the teacher said. After they agreed the storyline they storyboarded the scenes and divided up the tasks needed to complete the artwork.



Storyboarding

They worked in groups and individually to make the characters and the three sets necessary for the script. The teacher advised and supervised the process which included the digital picture-taking, the transfer of the pictures to a laptop, the videoblending and post-production work.

In both schools the Digital Hub's Cliff Brown was on hand for consultation during the animation process. The Hub had decided to expand the pilot project and this

year offer it to secondary schools in the Liberties area. Cliff said the most complicated work occurs at the later phases in Claymation. "I suppose the initial stages are easy enough - in so far as the process involve storyboarding initially, that's the planning of the movements, the scenes that will be



Look at my tree

needed, the props that will be needed, the characters that will be needed - that element of it is straightforward enough. The actual creation of events and characters through a variety of art materials that's straightforward enough," Cliff said.



Setting the scene

"Also it's quite simple in terms of the photography element, no-one has found any difficulty with that. The difficulties that have arisen are when it comes to using the software. It depends again on the individual teachers, some of them have technical expertise with computers and some of them don't. Those who don't sometimes have

some difficulties with some elements of it, they'll often call and ask for help. One of the issues we have found with the software is that it has to run on a reasonably good computer. It doesn't work terribly well on older machinery or on computers that don't have a graphics card. It often can be very slow running and at times can freeze up but that's because it's a graphics intensive programme, it requires memory, good RAM, so machines that are lacking in a bit of power you tend to find it doesn't run well on those."

When the students were asked what they thought about the Claymation project their views were mainly positive. One student wrote a detailed account: “Our storyline was very simple and I think it was its simplicity that was a positive in this project. It was basically a fairy tale with a twist, Little Red Riding Hood turned a little bit sour.



Minature models

“It was fun as we had complete control of the shots, the angles, characters everything!! We had to plan absolutely everything and when shooting we realized we probably should’ve more detail. That student’s views on camerawork were: “Taking the pictures was good fun too - manipulating the clay to imitate movement was fun. There was definitely a lot of teamwork involved. It was great because there was something for everyone. Leaders emerged that weren’t there before.



Busy at work

“The actual building of the set and characters was extremely fun for me, although everyone can make the same thing and it will look different. We all had the same basic idea there was a lot of teamwork. We hope to record voice and add a soundtrack....Overall it was a great experience and it made me want a camera (which I’m getting for my birthday). It really shows how much work goes into Wallace and Gromit etc!!

“I thought it was a great opportunity and I’m really glad I had the chance to do it. And if I had to do it again I would definitely choose to do it with my class, as we all clicked really well together. It’s not that common a thing to do so we were very

lucky to get all the help we did get.....This project was brilliant as there was sooo many aspects to it - art and sculpture, painting, photography, story writing, computer editing, sound recording, sound editing and on and on and on...!! I learnt loads and I think it sparked an interest in, not only me, but in a high percentage of the class. It really was great and I think it should be on every transition year curriculum."



Behind the scenes

The other 12 students' views on the project were:

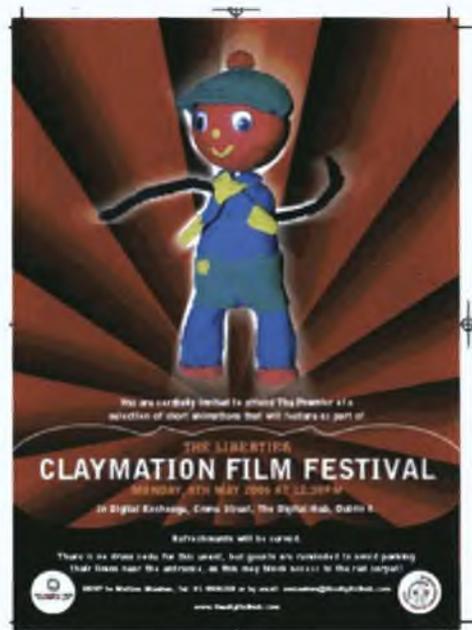
1. I thought the project was very interesting and well worth doing.
2. I thought it was really great and I had a load of fun! :)
3. It's fun to do and will hopefully all be finished soon. It should look good. I liked doing this project. I got a lot out of it.
4. If there's good teamwork, then it's a great thing to try out, and it's fun if you get involved and help make things because the finished product will be a lot much more pleasing. There was something for everyone, even those who didn't want to make the set or props.
5. I think it's very artistic and creative and it boosts people's imaginations to do more of this in future life if they enjoyed it!
6. Well we've not finished it yet but so far so good.
7. Good.
8. I think it's good to start new things and this was certainly new and fun!
9. I enjoyed myself. I can't wait to see what the outcome will be.
10. So far I am enjoying it, something fun and interesting to do - you get to put your creativity to use and work as a team to produce something you can be proud of.

11. Not too bad.

12. I thought it was a great opportunity to miss classes.

On May 8th a three-day Liberties Claymation Film Festival for those participating in the animations was held at the Digital Hub. The pupils from the ten schools, their teachers, parents, local dignitaries and the media were invited to see a showcase of the 25 films created by this year's venture.

Cliff Brown of the Digital Hub said: "Claymation is a very different way of learning in that it brings together language, art, music, drama, writing, indeed, a lot of elements going on, some of the storyboards can actually be historical in nature. Some have focused on folklore so they are bringing in all these elements of the primary school curriculum. It's a nice way of using technology but also the technology is not the centre of the project, it's just the tool for the creation of the movie. The end product is something which the children feel they've total ownership of, they are very proud of their work they feel they've produced movies to the standard of Wallace and Grommit.



Publicity material

"They want everyone to see it, there's a great buzz about the finished movie. And there's a great deal of fun in the making of it as well. For many of these children even to hear their own voices as part of a soundtrack is a very novel thing and a very rewarding thing, and this is where language development is taking place with scripts they've written, their voices being used.....there's a memory element to it and yet they hear themselves too, they don't often hear themselves in a movie so this is a very rewarding element to the work."

3.3 Pupils' Survey Findings

Question 1. How did you work in Claymation class:

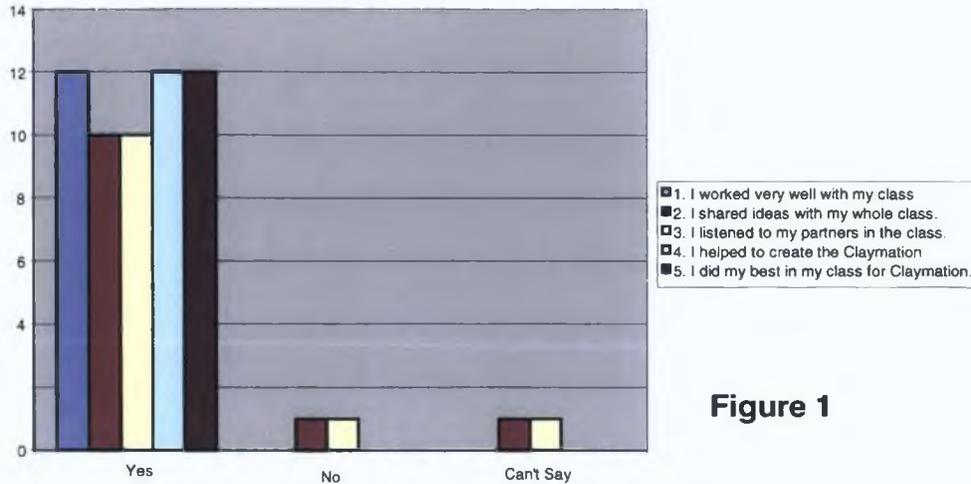


Figure 1

100% of pupils said they worked well in class, helped create the Claymation and did their best in class. By contrast 8% said they did not share ideas with the class nor listen to partners. A similar 8% said they couldn't say if they shared ideas with the whole class nor listened to partners in the class.

Question 2: How well did your group work together?

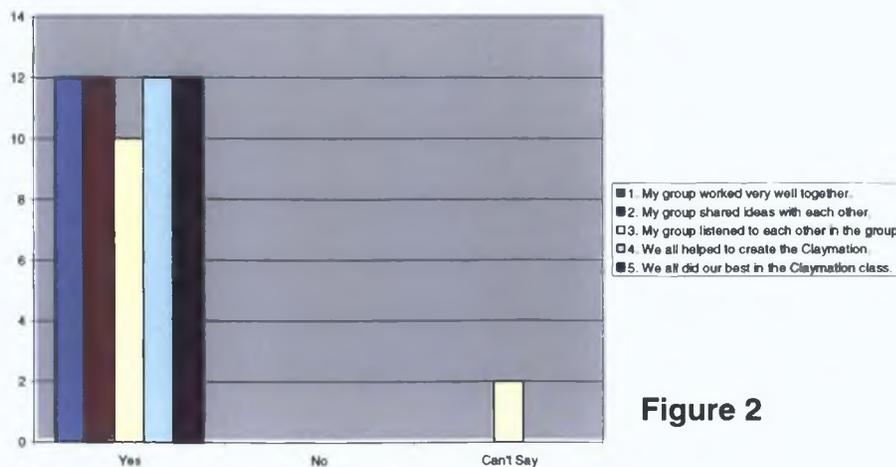


Figure 2

100% said their group worked very well together, shared ideas with each other and all helped to create the animation to the best of their abilities in the Claymation class. 17% said they couldn't say if their group listened to each other.

3.4 Teachers' Survey Findings

Question 1. Do you have a computer at home that you use for school-related activities?

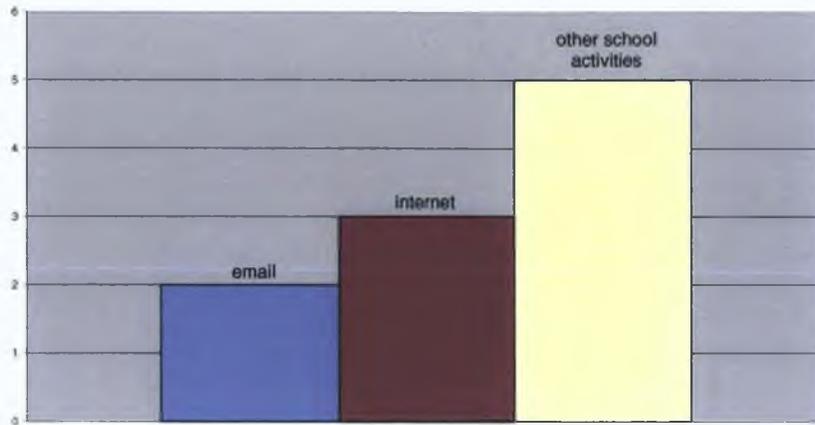


Figure 3

Up to **50%** of teachers use a home computer for school-related general activities; the internet 30% and email 20%.

Question 2. Do you have a computer at home that you use for personal email, internet or other activities? **60%** said yes to all three activities.

Question 3. What percentage of the information you receive about teaching with technology is from?

The majority 48.9% said they received most information from **the local resource person**, 21.7% said from peers/colleagues and 11.7% said the internet.

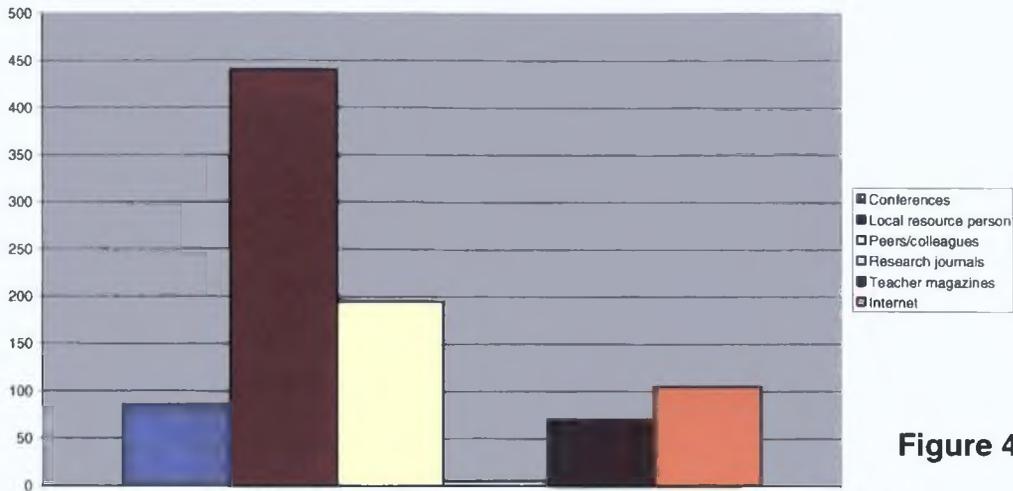


Figure 4

In fourth place 9.4% got information from conferences, 7.8% from teachers' magazines and the least-consulted source was research journals 0.6%.

Question 4. What, if anything, do you need to make ICT an integral part of your school or classroom's curricular activities?

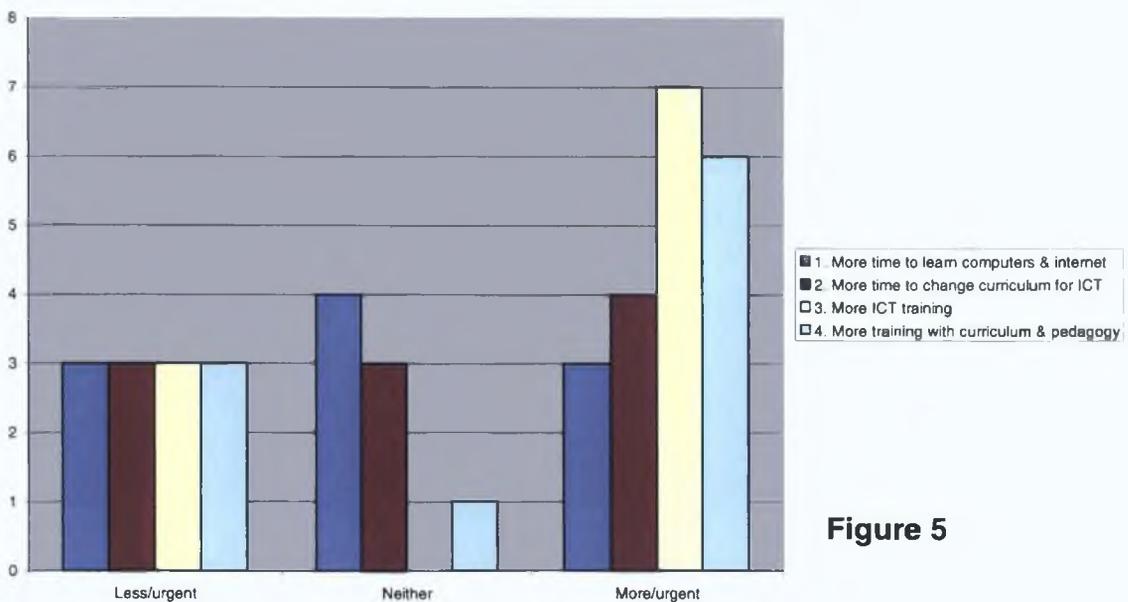


Figure 5

1. Need more time to learn to use computers and the internet, 40% were neutral, 30% thought it 'less/urgent' and 30% 'more/urgent'.

2. Need more time to change the curriculum to better incorporate ICT, **40%** 'more/urgent', 30% neither and 30% said it was 'less/urgent'.
3. Need more ICT training, **70%** said it was 'more/urgent' and 30% 'less/urgent'.
4. Need more training with curriculum & pedagogy that integrates ICT, **60%** rated this 'more/urgent', 10% neither and 30% 'less/urgent'.

Question 4. What if anything do you need to make ICT an integral part of your school or classroom's curricular activities?

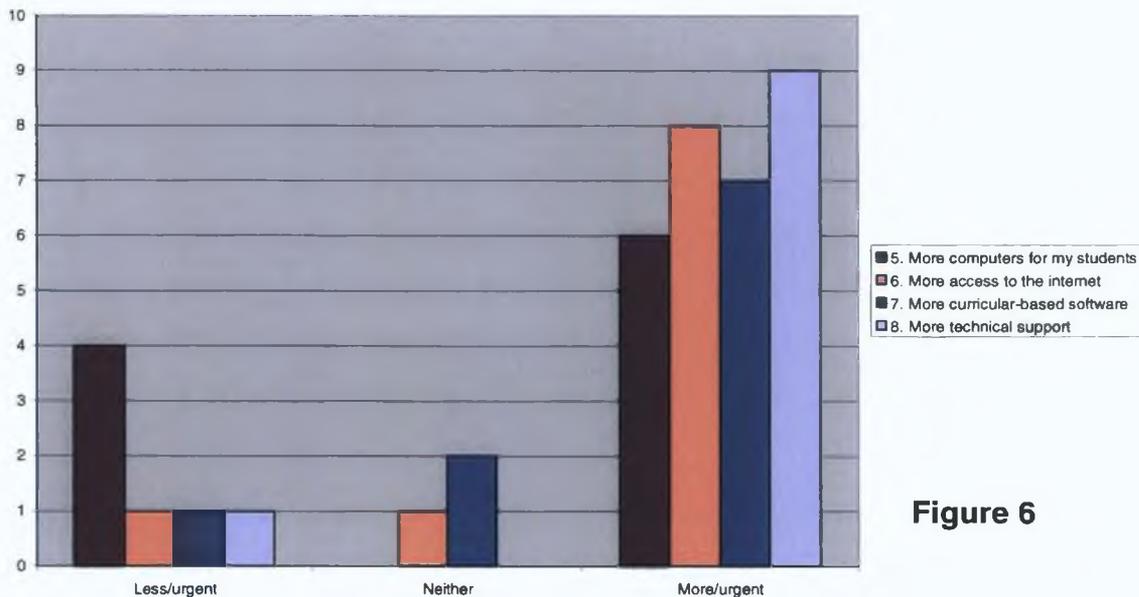


Figure 6

5. Need access to more computers for my students, **60%** rated this 'more/urgent' and 40% 'less/urgent'.
6. Need more access to the internet, **80%** 'more/urgent' and 10% neither and 'less/urgent'.
7. Need more software that is curricular-based, **70%** said 'more/urgent' while 20% were neutral and 10% said 'less/urgent'.

8. Need more technical support to keep the computers working, **90%** thought this 'more/urgent' while 10% thought it 'less/urgent'.

Question 4 cont. What if anything do you need to make ICT an integral part of your school or classroom's curricular activities?

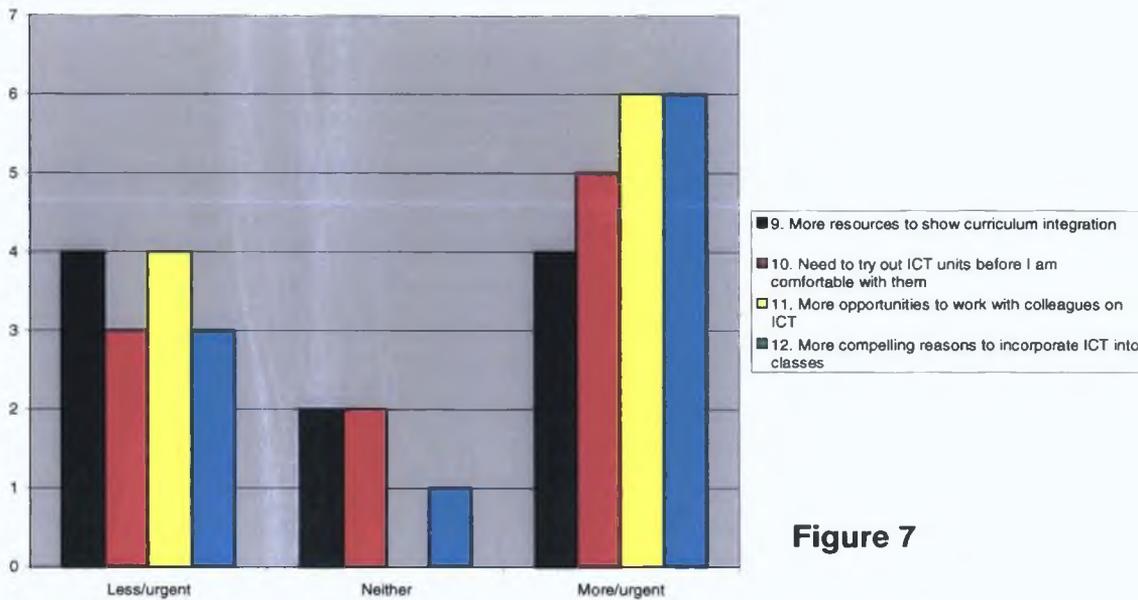
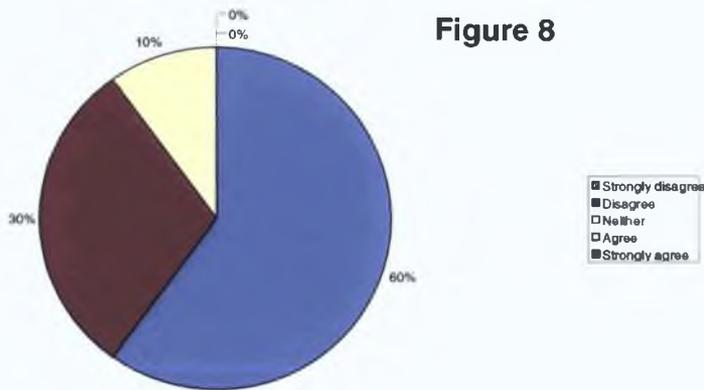


Figure 7

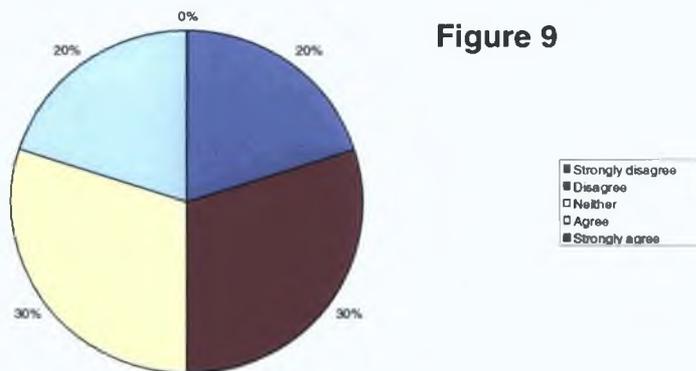
9. Need more resources that illustrate how to integrate technology into the curriculum, **40%** rated it 'more/urgent', **40%** 'less/urgent' and **20%** neutral.
10. Need to be able to try out ICT-enhanced curriculum units in my classrooms several times before I am comfortable with them, **50%** 'more/urgent', **30%** 'less/urgent' and **10%** neither.
11. Need more opportunities to work with colleagues to become more proficient using ICT-enhanced curriculum units, **60%** 'more/urgent' to **40%** 'less/urgent'.
12. Need more compelling reasons why I should incorporate ICT into the classroom, **60%** 'more/urgent', **30%** 'less/urgent' and **10%** neither.

Question 5.1 I believe that textbooks will be replaced by electronic media within 5 years. 60% 'disagreed strongly', 30% 'disagreed' totaling **90%** to 10% neither.



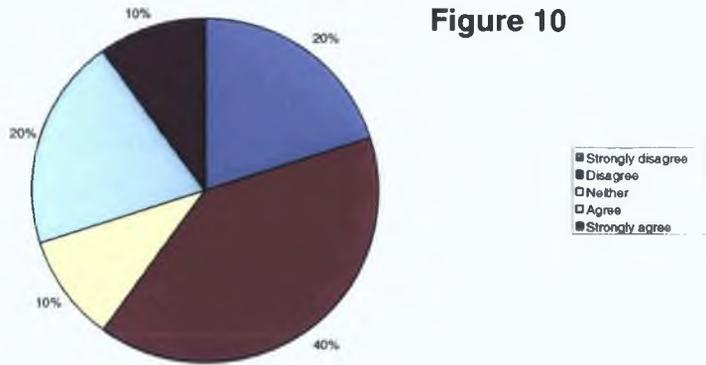
60% 'disagreed strongly', 30% 'disagreed' totaling **90%** to 10% neither.

Question 5.2 I believe that the role of schools will be dramatically changed because of the internet within 5 years.



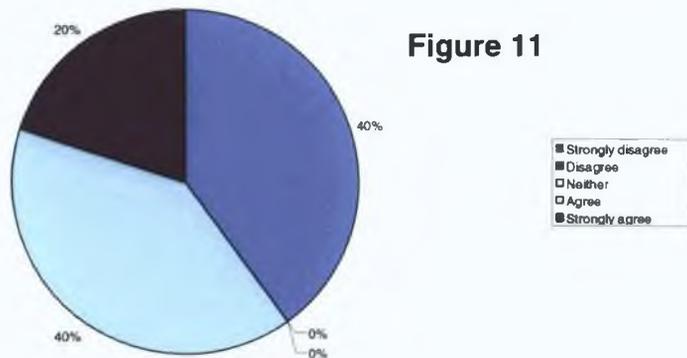
50% disagreed (20% 'strongly' and 30% 'disagreed') while 30% were neutral and 20% 'agreed'.

Question 5.3 I believe that the role of the teacher will be dramatically changed because of the internet within 5 years.



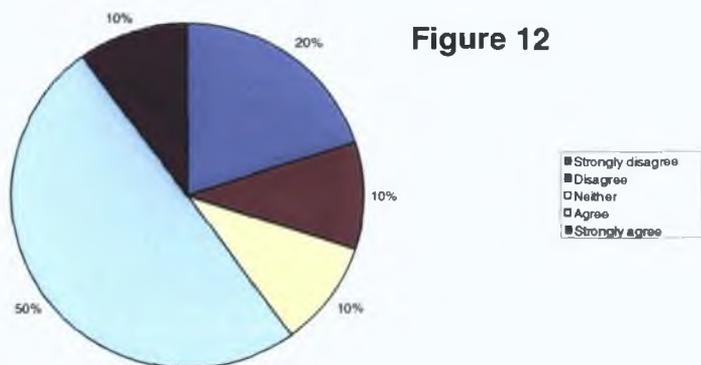
60% disagreed – (40% ‘disagreed’ and 20% ‘strongly’), 10% were neutral and 30% agreed (20% agree and 10% strongly).

Question 5.4 I believe that I am a better teacher with technology



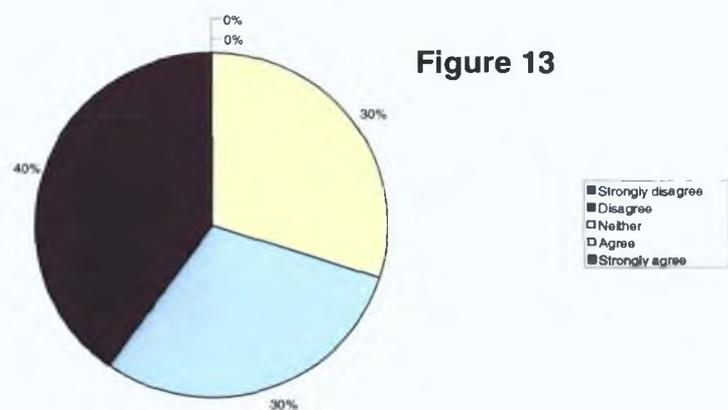
40% ‘strongly disagreed’ and 40% ‘agreed’, 20% ‘strongly agreed’ making a total of 60% in agreement.

Question 5.5 I believe that the internet will help narrow the societal gap between the "haves" and "have nots".



60% agreed, (50% 'agreed', 10% 'strongly'), 10% neutral and 30% disagreed (10% disagreed and 20% strongly).

Question 5.6 If my district offered internet based professional development activities, I would use them.



70% agreed (40% 'strongly' and 30% 'agreed') with 30% neutral.

Question 5.7 Student time on the internet is time well spent.

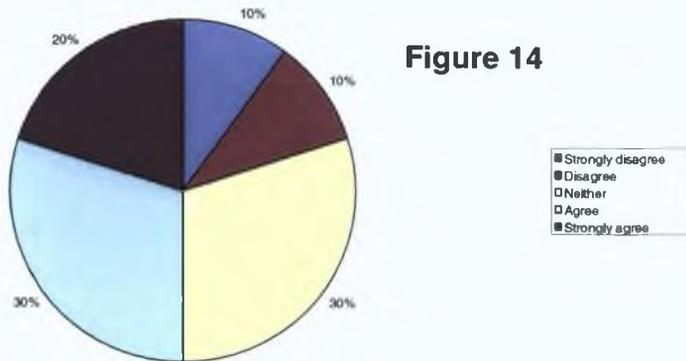


Figure 14

A total of **50%** agreed (30% 'agreed', 20% 'strongly') while 30% replied neutrally and 20% disagreed (10% 'strongly' and 10% 'disagreed').

Question 5.8 Technology can help accommodate different learning styles.

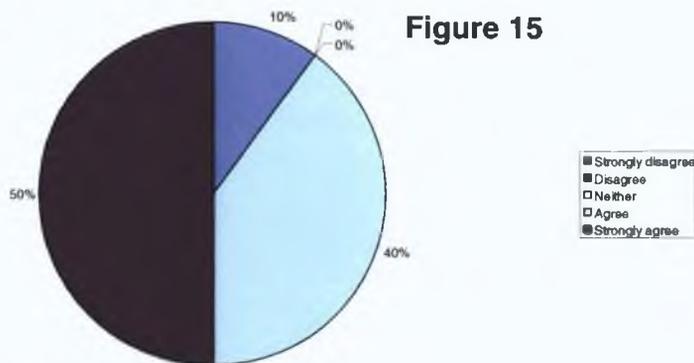


Figure 15

90% were in favour (40% 'agreed' and 50% 'strongly agreed') while 10% 'strongly disagreed'.

Question 6: What is the number of computers per classrooms. Three said one, five said none, one said 10 in computer room; another said 16 in computer room.

Question 7: What is the number of internet connections per classrooms. Seven said one while three said none.

Question 8: Students engage in computer-based activities (but not internet) for curricular purposes: Teachers said up to **50%** engaged in computer-based activities, but *not* internet, for curricular purposes of less than 15 minutes per week; 40% - engaged in computer-based activities from 15-45 minutes with 10% spending longer - from 46-90 minutes.

Question 9: Students engage in internet-based activities for curricular purposes: Teachers said **60%** of students did *not* engage in internet-based activities for curricular purposes; 40% *did* for <15 minutes per week.

Question 10: Do you have compatible computers at home and school? **70%** said yes while 30% said no.

Question 11: Do you have a laptop? **80%** said yes while 20% said no.

Question 12: How many minutes do I use the computer (but not internet) in my teaching/administrative activities:

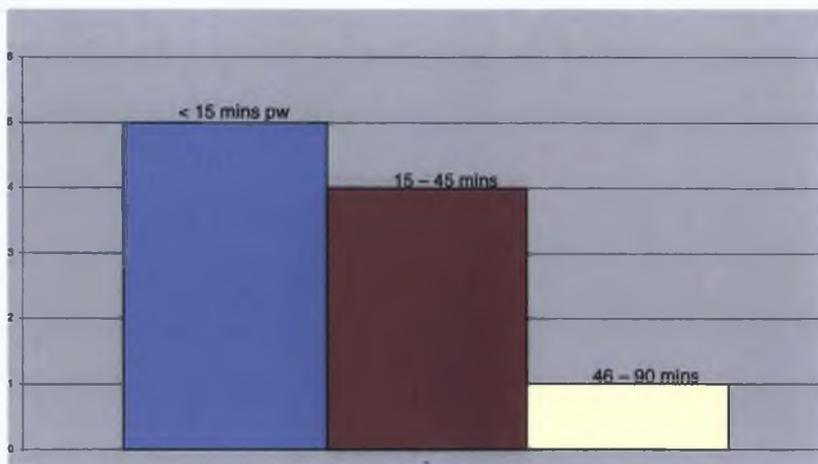


Figure 16

50% said they spend <15 minutes per week using a computer (but *not* the internet) for teaching/administrative activities; 40% spend 15-45 minutes and 10% spend 46-90 minutes.

Question 13: How many minutes do I use the internet in my teaching/administrative activities:

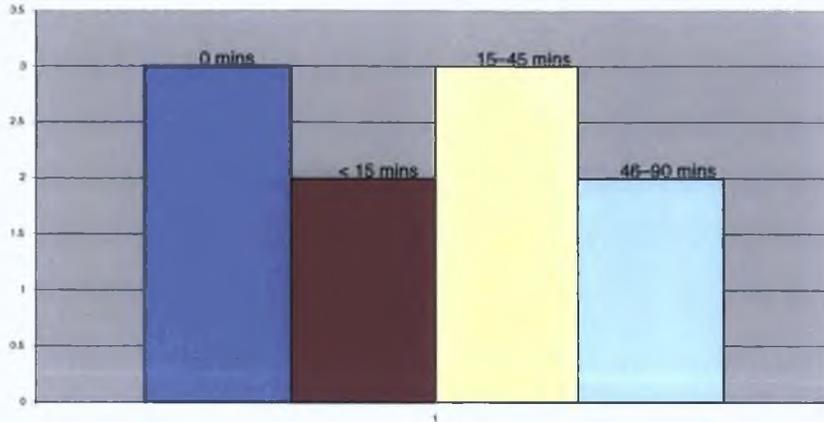
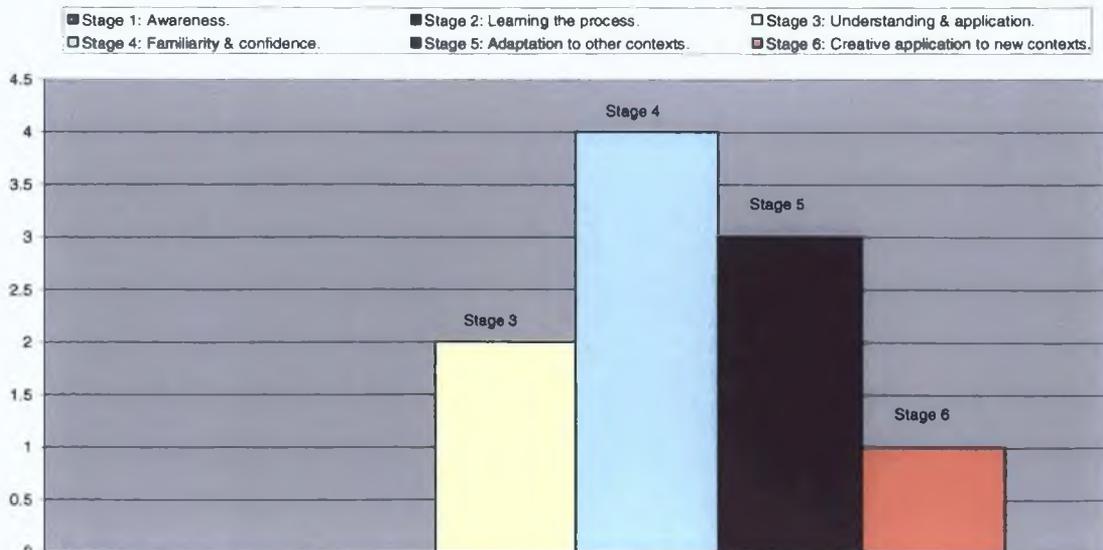


Figure 17

30% spend no time on the internet for teaching/administrative activities, 20% spend <15 minutes; 30% spend 15-45 and 20% spend 46-90 minutes per week (70% spend from 1-90 mins weekly).

Question 14: Choose the number of the stage that best describes your level:

Figure 18



Stage 1: *Awareness* and Stage 2: *Learning the process*: None.

Stage 3: *Understanding & application of the process*: 20%.

Stage 4: *Familiarity & confidence*: 40%.

Stage 5: *Adaptation to other contexts*: 30%.

Stage 6: *Creative application to new contexts*: 20%.

Question 15: Any other comments:

A: "I believe we're "blinded by science" and bewitched by IT. I'm not a technophobe but techno-sceptical as a language teacher I believe 'talk-and-chalk (ok-white-board) works best as a geography teacher I'm intrigued by the possibilities."

B: "Internet doesn't always work at school".

C: "It would be very useful if - there was a more accessible means of technical support available to the school, in the event of breakdown or even queries. More finances available to upgrade/purchase software and computers - more courses available in the locality for futherance of it skills."

3.5 Transition Year Students' Survey Findings

Question 1. Is there a computer available for you to use at any of these places?

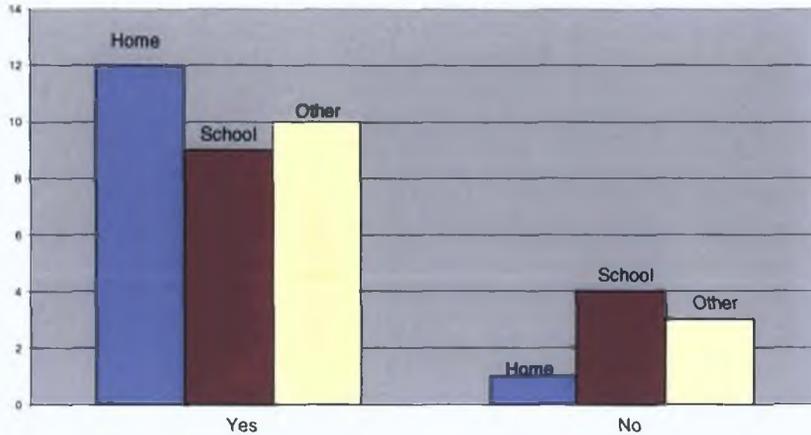


Figure 19

92% of T/Y Students had access to a computer at home, (77%) other places and school (69%). A total of 31% did *not* have access to computers at school, 23% did not access computers in other places and 8% did not have access at home.

Question 2. Have you ever used a computer? 100% of T/Y Students said yes.

Question 3. How long have you been using computers?



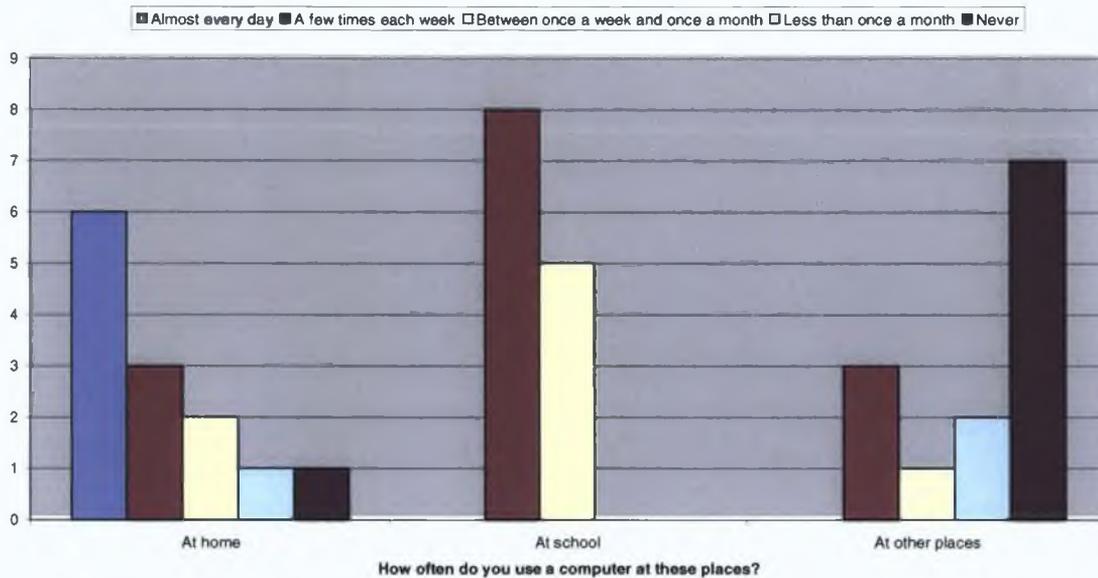
Figure 20

The majority of T/Y Students **53.8%** have been using computers >5 years, **38.5%** have been using them for 3-5 years and **7.7%** for 1-3 years.

Question 4. How often do you use a computer at these places?

46% T/Y Students used a computer at home 'daily' only. 'A few times a week' **62%** at school with **23%** at home and at other places.

Figure 21

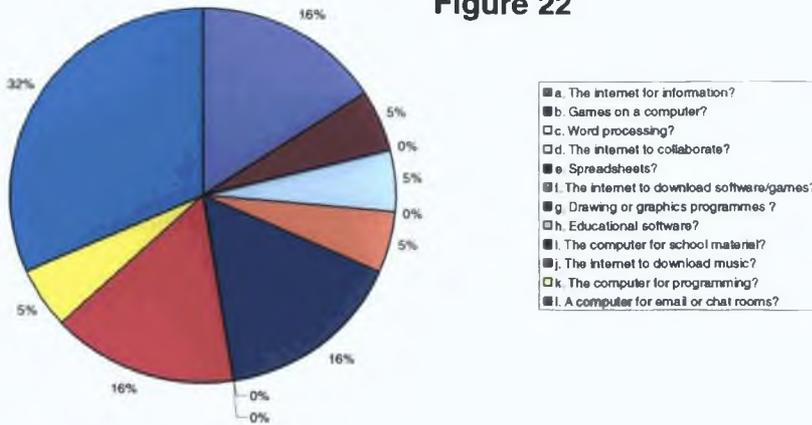


38% have access to a computer at school between 'once a week and once a month', 15% at home and 8% at other places; a 15% total said they had access to a computer at other places 'less than once a month' and in the same category 8% at home. A total of 54% said they never had access to computers at other places with 8% saying they never have access at home.

Question 5. How often do you use computers?

5.1 Almost every day: T/Y Students reported using computers for email **46%** of the time (l). Three other uses rated 23% - the internet to look up information about people, things and ideas (a); drawing, painting and using graphics programmes (g) and downloading music (j).

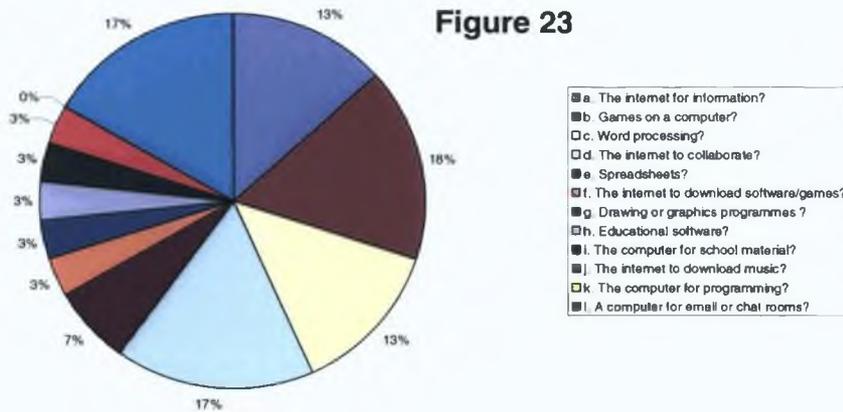
Figure 22



8% said they played games (b); collaborated with a group or team (d); downloaded games software (f) and did programming (k) almost 'daily'. They did *not* (0%) do word processing (c); spreadsheets (e); use educational software (h) or use computers for school material (i) daily.

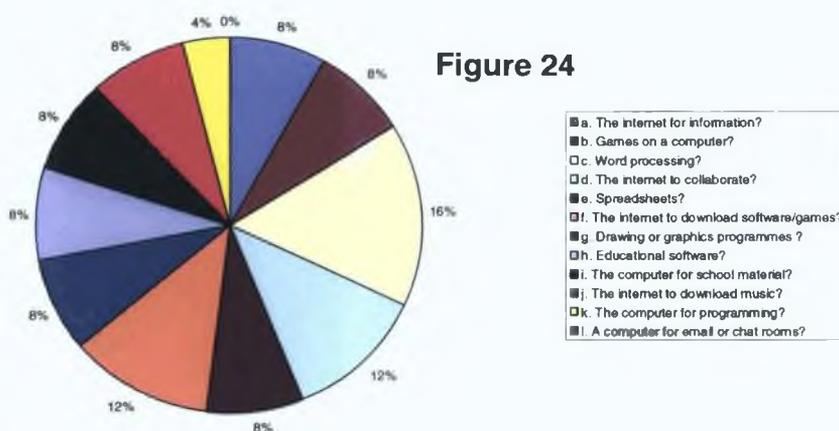
5.2 A few times each week: The respondents tied on three issues they used computers for 'a few times each week'.

Figure 23



38% T/Y Students said they played games (b); collaborated with others on the internet (d) and sent/received emails (l). Two activities rated 31%, using the internet for information (a) and word processing (c); 5% for spreadsheets (c). Downloading software (f), using graphics programmes (g), use of educational software (h) and using the computer for school purposes (i) rated 8% along with using the internet to download music (j).

5.3 Between once a week and once a month: computers were used for (c) word processing **31%** by T/Y Students.



Going on the internet to collaborate with others (d) and downloading games software (f) featured at 23% each. 15% said they used computers for information on the net 'between once a week and once a month' for (a); gaming (b); spreadsheets (e); graphics programmes (g); educational software (h); school materials (i) and downloading music (j). 8% for programming (k).

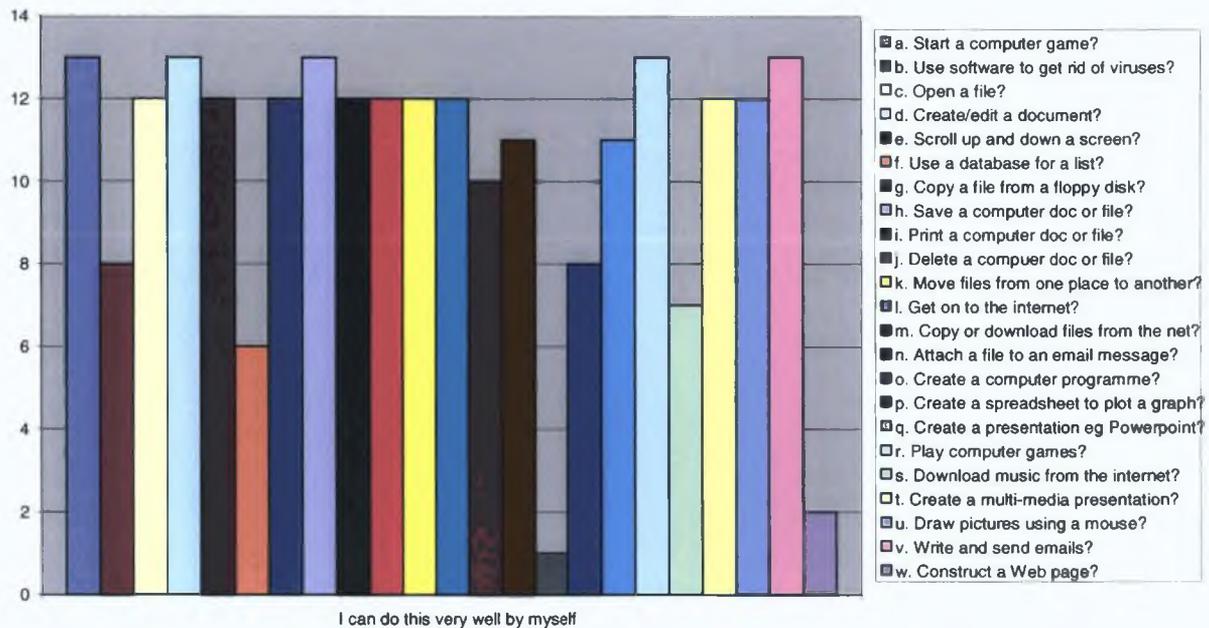
5.4 Less than once a month: A total of **38%** T/Y Students said they used computers for helping with school materials 'less than once a month'. Four activities were rated at 23% - using the internet for information (a); gaming (b); word processing (c) and downloading music (j). 15% said they used it to download software (j); use graphics programmes (g) and access educational software (h). 8% said collaborating online (d); spreadsheets (e) and email (l).

5.5 Never: A total of **85%** T/Y Students said they *never* used a computer for programming (k). 62% said never for spreadsheets (e) or educational software (h). Downloading games and software never (f) at 46%. Two activities never at 38% - using graphics programmes (g) and a computer for school purposes (i). 31% never used a computer to download music (j). 23% had never collaborated online (d), 15% had never played games on a computer (b) or word processed

(c) and 8% said they never sent emails (l) or used the internet to look up information (a).

Questions 6 & 7 (A). How well can you do each of these tasks on a computer by yourself?

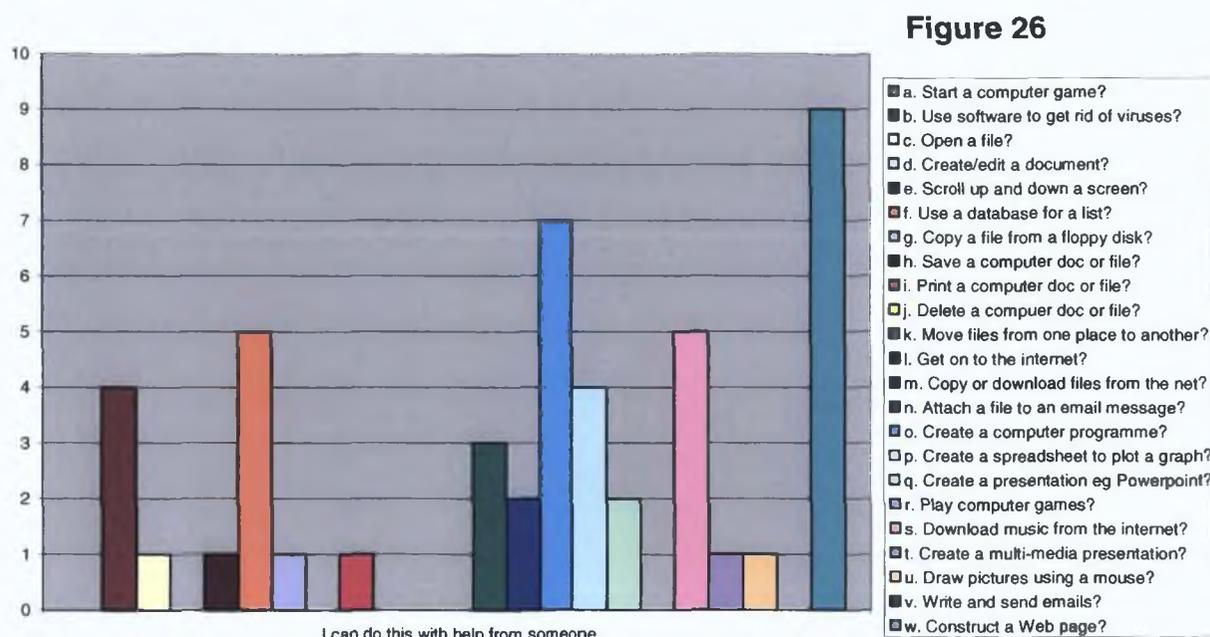
Figure 25



There was a **100%** response rate in **five** areas to the question about how well T/Y Students could perform tasks 'by themselves' including (a) starting a computer; (d) create/edit a document; (h) save a computer document or file; (r) play computer games and (v) write and send emails. There were **nine** activities in this category **at 92%** (c) open a file; (e) scroll a document up and down a screen; (g) copy a file from a floppy disk; (i) print a computer document or file; (j) delete a computer document or file; (k) move files from one place to another; (l) get on the internet; (t) create a multimedia presentation and (u) draw pictures using a mouse. At **85%** were **two areas** (n) attach a file to an email message and (q) create a presentation eg using Powerpoint. 77% could (m) copy or download from the internet. 62% could (b) use software to get rid of viruses and (p) create a spreadsheet.

Questions 6 & 7 (B). How well can you do each of these tasks on a computer with help from someone?

The T/Y Students said **54.7%** could (o) create a computer programme in Logo, Pascal or Basic *'with help from someone'*.



At 38% were (f) using a database to produce a list of addresses and (s) download music from the internet. At 31% (b) use software to find and get rid of computer viruses and (p) create a spreadsheet to plot a graph. The at 23% (m) copy or download files from the internet. 15% students said they could, with help, (n) attach a file to an email message and (q) create a presentation using Powerpoint. At 8% students could, with help, (c) open a file, (e) scroll a document up and down a screen, (g) copy a file from a floppy disk, (i) print a computer document or file, (t) create a multi-media presentation or (u) draw pictures using a mouse all with some help.

Questions 6 & 7 (C). How well can you do each of these tasks on a computer? In response to the category *'I know what this means but cannot do it'*

(o) **23%** T/Y Students said create a computer programme, 15% said (f) use a database to produce a list of addresses or (w) construct a web page. Six responses at 8% said (b) use software to find and get rid of viruses, (j) delete a computer file or document, (k) move files from one place to another on a computer, (l) get on to the internet, (p) create a spreadsheet to plot a graph or (s) download music from the internet. 15% said (o) create a computer programme in Logo, Pascal or Basic.

Question 8. Who taught you most about how to use computers?

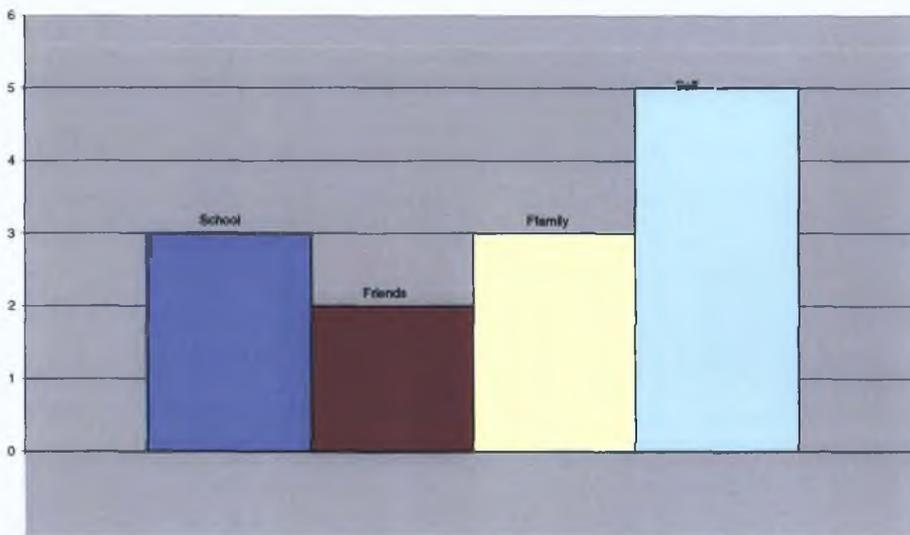


Figure 27

The majority of T/Y Students **38.5%** taught themselves, 23.1% said at school and by family, 15.4% received help from friends.

Question 9. Who taught you most about how to use the internet?

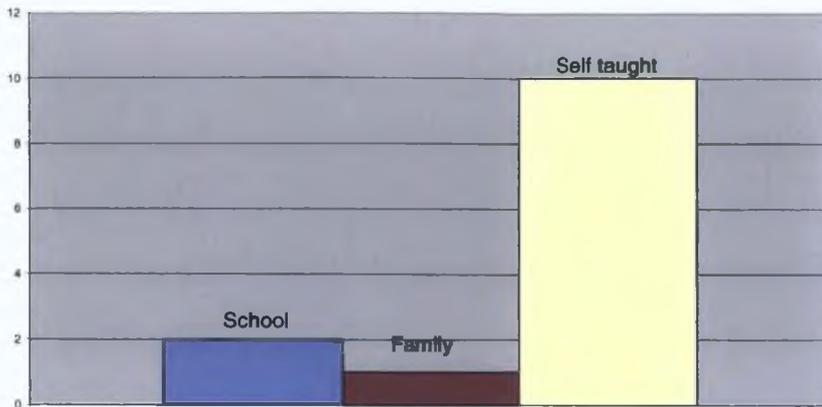


Figure 28

A majority T/Y Students **76.9%** taught themselves the internet, with school in second place at 15.4% and family in third place at 7.7%.

Question 10. Are you male or female? Of the 13 seven of the T/Y Students were female and six male.

Question 11. What did you think about the Claymation project? The following are comments the students wrote.

A. Storyline:

Our storyline was very simple and I think it was its simplicity that was a positive in this project. it was basically a Fairy Tale with a twist, Little Red Riding Hood turned a little bit sour. Hard in places. .Fantastically fun, I've always liked listening to and writing stories. Good X 4. Good teamwork involved in making it, it seems funny. Strange, different. Very good. Unique, different. Pretty funny. Unoriginal

B. Storyboarding the scenes

Storyboarding was fun as we had complete control of the shots, the angles, characters everything!! We had to plan absolutely everything and when shooting we realized we probably should've more detail. Hard in places. Fun, I like writing

stories so that was fun. Excellent. Alright I suppose (I did that bit). Other people did it. Brilliant. As good as we could do. As best as we could do. Great. Really good. Took a while. Well done up.

C. Artwork

The actual building of the set and characters was extremely fun for me, although everyone can make the same thing and it will look different. We all had the same basic idea there was a lot of teamwork. Interesting. Great fun making all the set, especially some of the more gruesome scenes were fun to make. Very good. Fairly good. Quiet well. Excellent. Ok X 2. Great. We tried. Boring. Good & bad.

D. Camera work

Taking the pictures was good fun and manipulating the clay to imitate movement was fun. Interesting X 3. Soooo many pictures, but worth it. Not started. We have some good photographers, it should be great. Excellent. N/A - haven't got to here yet X 3 responses.

E. Editing

We didn't actually complete editing yet, but seeing all the pictures turn into movement was really amazing. Pretty easy and fun! We haven't done it yet, but it should be promising. N/A X 8 responses. Interesting.

F. Sounds

We hope to record voice and add a soundtrack. We haven't done it yet but putting music to it will be fun and i think the voicing should be a laugh. Haven't done it either, but it should be good and funny. N/A X 10

G. Groupwork

There was definitely a lot of teamwork involved. It was great because there was something for everyone, leaders emerged that weren't there before. It has

brought the class together. It was fun thought there were a good few people who didn't get involved, but I work well in a group. Good X 2. Good, but sometimes a bit slow since there was a lot of us. Outstanding. This was ok. N/A. Excellent X 2. The best we have ever been together. A laugh.

H. Overall

Overall it was a great experience and it made me want a camera (which I'm getting for my birthday) it really shows how much work goes into Wallace and Gromit etc!! Good fun. Great fun! Coming along fine. Fun and interesting if everyone's involved. Good X 5. A fun creative way to spend your classes. Not too bad. Good experience.

Question 12. What did you think about the Claymation project?

- I thought it was a great opportunity and I'm really glad I had the chance to do it. And if I had to do it again I would definitely choose to do it with my class, as we all clicked really well together. It's not that common a thing to do so we were very lucky to get all the help we did get. This project was brilliant as there was sooo many aspects of it- art and sculpture painting, photography, story writing, computer editing, sound recording, sound editing and on and on and on...!! I learnt loads and I think it sparked an interest in not only me but in a high percentage of the class. It really was great and I think it should be on every transition year curriculum, Caragh.
- I thought the project was very interesting and well worth doing
- I thought i was really great and i had a load of fun! :)
- It's fun to do and will hopefully all be finished soon. It should look good, i liked doing this project I got a lot out of it.
- If there's good teamwork, then it's a great thing to try out, and it's fun if you get involved and help make things, because the finished product will be a

lot much more pleasing. There was something for everyone, even those who didn't want to make the set or props.

- I think it's very artistic and creative and it boosts people's imaginations to do more of this in future life if they enjoyed it!
- Well we've not finished it yet but so far so good
- Good
- I think it's good to start new things and this was certainly new and fun!
- I enjoyed myself I can't wait to see what the outcome will be.
- So far I am enjoying it, something fun and interesting to do - you get to put your creativity to use and work as a team to produce something you can be proud of.
- Not too bad
- I thought it was a great opportunity to miss classes

3.6 Comparisons of OECD/PISA Survey & Transition Year Students' Survey Findings

The survey used for the transition year students (T/Y Students) was based on the ICT questionnaire in the Programme for International Student Assessment (PISA) report OECD 2005, pp 84-87. This results section compares the T/Y Students survey findings with the total OECD and Ireland averages.

Question 1: The percentage of T/Y Students having access to a computer at home, school or other places and PISA survey results for OECD average and Ireland average.

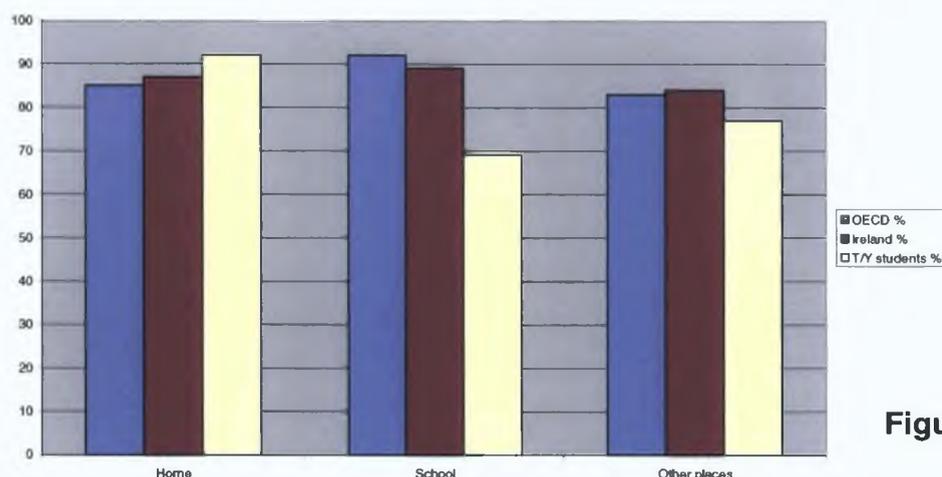


Figure 29

The T/Y Students in Dublin had more access to computers at home, and less access both at school and in other places, than the OECD and Ireland averages for all three places.

Table 1

	OECD %	Ireland %	T/Y Students %
Home	85	87	92
School	92	89	69
Other places	83	84	77

Question.2 The T/Y Students had **100% response** to the question have you ever used a computer whereas the OECD average for *never* having used a computer was 1.71% and Ireland 0.29%.

Question.3 A majority of T/Y Students 53.8% have been using computers for more than five years compared to 30% for the Irish average while 38.5% for 3-5 years compared to a rough figure of 30% for Ireland. That totals **92.3% to 60%** for 3-5 years and more. Raw data was unavailable to make precise comparisons with the OECD.

Question 3: How long have you been using a computer: a majority of the T/Y Students **53.8%** have been using computers 'for more than five years', 38.5% have been using them 'for 3-5 years'. The OECD report shows Ireland in 16th place with just slightly over 30% of 15-year-olds using computers 'for more than five years'. Another 30% have been using computers for '3-5 years'.

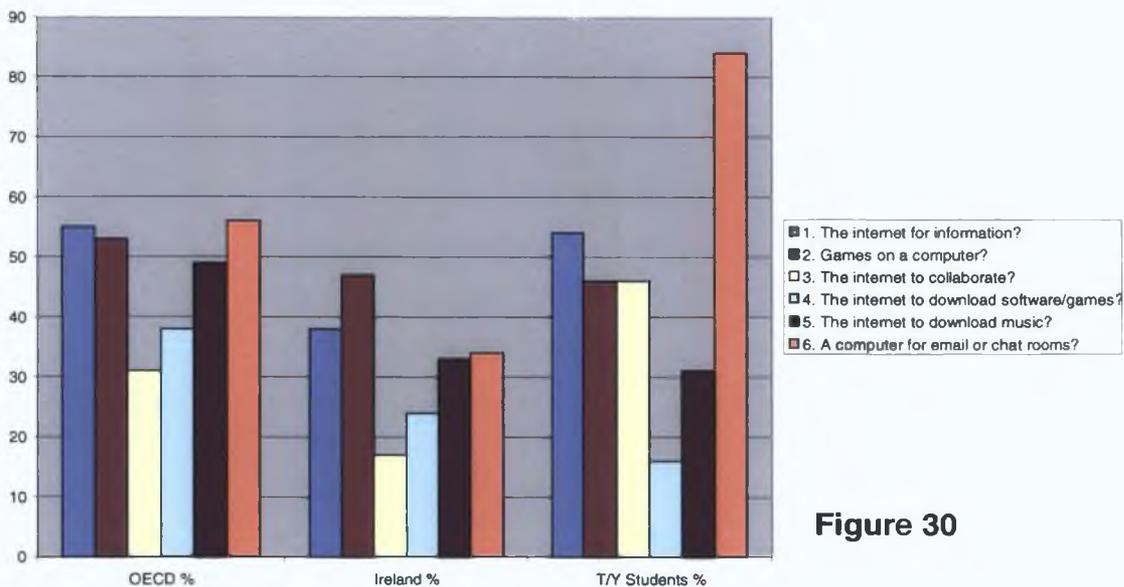
Question 4: How often do you use a computer at these places: **46%** T/Y Students used a computer at home 'daily'; 62% used them at school 'a few times a week' while 23% used them at home and at other places 'weekly'; 38% have access to a computer at school between 'once a week and once a month', 15% at home and 8% at other places. While the OECD exact data in percentages was unavailable on its own for this question Ireland came 20th (figure 3.2 p.37) for 15-year-olds frequently using a computer behind countries that featured in the literature review including Canada (1st), Iceland (2nd), Australia (5th), United States (9th), Austria (12th), Finland (14th), Italy (16th), Hungary (18th) and Ireland (20th).

Question 5: How often do you use? The OECD grouped the responses 'almost every day' and 'a few times each week' into a 'frequent use' percent (figure 3.3 p.39) for which there was comparable T/Y Students data, thus the % of students' reporting *frequent use of ICT for internet and entertainment* is:

Table 2

	OECD %	Ireland %	T/Y Students %
1. The internet to look up information	55	38	54
2. Games on a computer	53	47	46
3. The internet to collaborate with a team	31	17	46
4. The internet to download software	38	24	16
5. The internet to download music	49	33	31
6. A computer for electronic communication	56	34	84

(a) The Dublin T/Y Students were lower in three out of the six categories, higher in two and lower than the OECD but higher than Ireland in one.

**Figure 30**

They were 1% under the OECD average for (1) using the internet but 6% higher than the Irish average. 7% below the OECD and 1% below the Irish average for (2) using games on a computer; 12% below the OECD and 10% below Ireland for (4) downloading software and 18% and 2% lower respectively for (5) downloading music from the internet. They were 15% higher than the OECD and 29% higher than Ireland for (3) collaborating with a team on the internet and the Dublin T/Y Students had a 28% and 50% higher rate of (6) using computers for email and electronic communication than the OECD or Ireland averages

respectively, this could be due to the ubiquitous permeation of email in the intervening years since PISA.

(b) Responses to the *frequency of use of ICT for programmes and software* was lower for the T/Y Students in four out of six categories, higher in one and lower than the OECD but the same as Ireland in another.

Table 3

	OECD %	Ireland %	T/Y Students %
1. The computer for programming	23	13	8
2. The computer to help learn school material	30	16	8
3. Educational software such as maths	13	9	8
4. Drawing, painting or graphics programmes	30	26	31
5. Spreadsheets	21	15	15
6. Word processing	48	34	31

The T/Y response was lower by 15% and 5% respectively for the OECD and Ireland averages on (1) programming; lower by 22% and 8% for (2) the computer to learn school material.

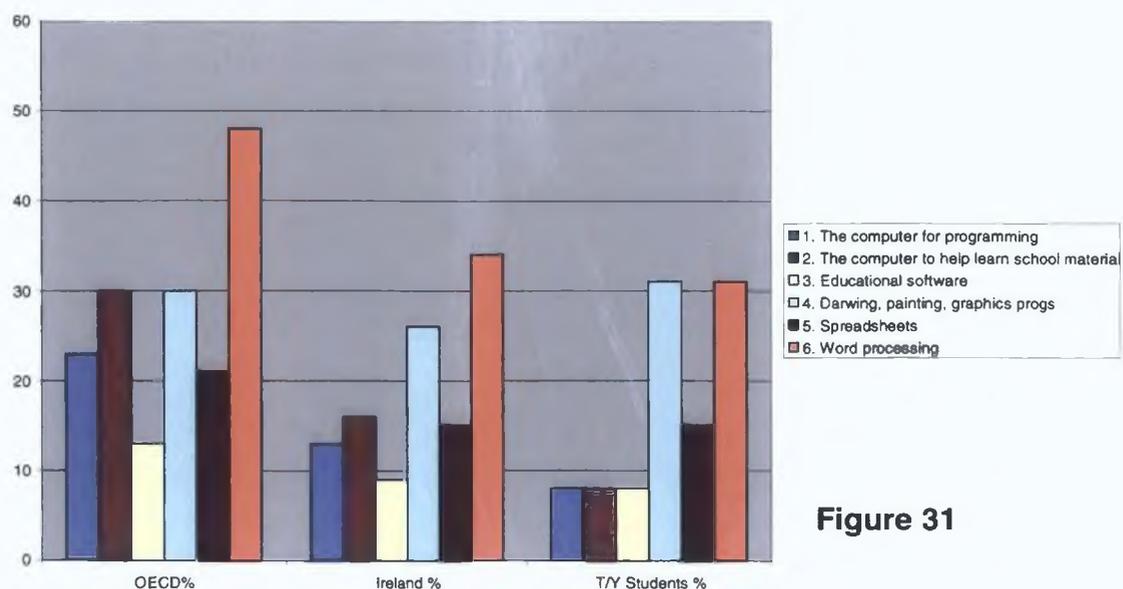


Figure 31

The T/Y Students' response was also lower by 5% and 1% for (3) using educational software and lower by 17% and 3% respectively for (6) word processing. The T/Y Students figure was lower by 6% of the OECD for (5) using spreadsheets but the same as Ireland at 15%. The only higher figure for both averages on frequency of use was by 1% and 5% for the OECD and Ireland figures respectively for (4) using drawing, painting or graphics programmes.

Question 6 & 7: In relation to the 23 options to the question OECD (figure 3.9 p.110) and T/Y Students data how well respondents could perform certain tasks the OECD grouped the data into three areas: (a) *routine ICT tasks*; (b) *internet tasks* and (c) *high-level tasks*.

Table 4

	OECD %	Ireland %	T/Y students %
1. Start a computer	86	90	100
2. Open a file	90	91	92
3. Create/edit a document	80	82	100
4. Scroll document up & down screen	87	90	92
5. Copy a file from a floppy disk	75	68	92
6. Save a computer document or file	88	91	100
7. Print a computer document or file	86	91	92
8. Delete a computer document or file	88	89	92
9. Move files from one place to another	76	66	92
10. Play computer games	65	95	100
11. Draw pictures using a mouse	85	91	92

(a) Routine ICT tasks: In 11 areas of routine ICT tasks the Dublin T/Y Students scored higher than the OECD or Ireland averages, four of these at 100% and seven tasks rated 92%.

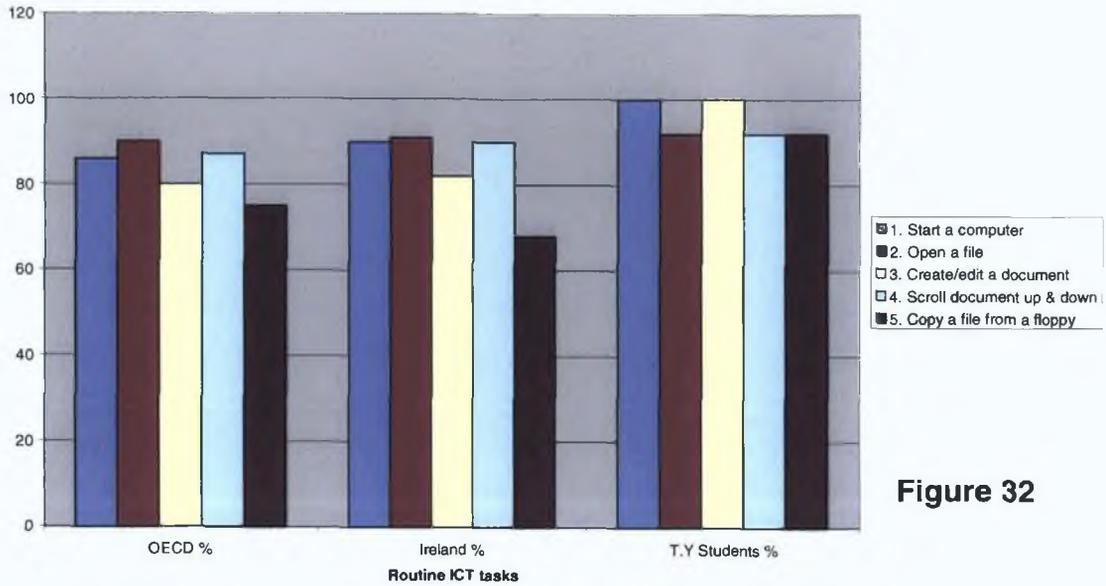


Figure 32

The T/Y Students were 24% higher on task (5) copying a file from a floppy than the Irish average and 17% higher than the OECD; on (9) moving a file from one place to another they were 26% higher than Ireland and 16% than the OECD.

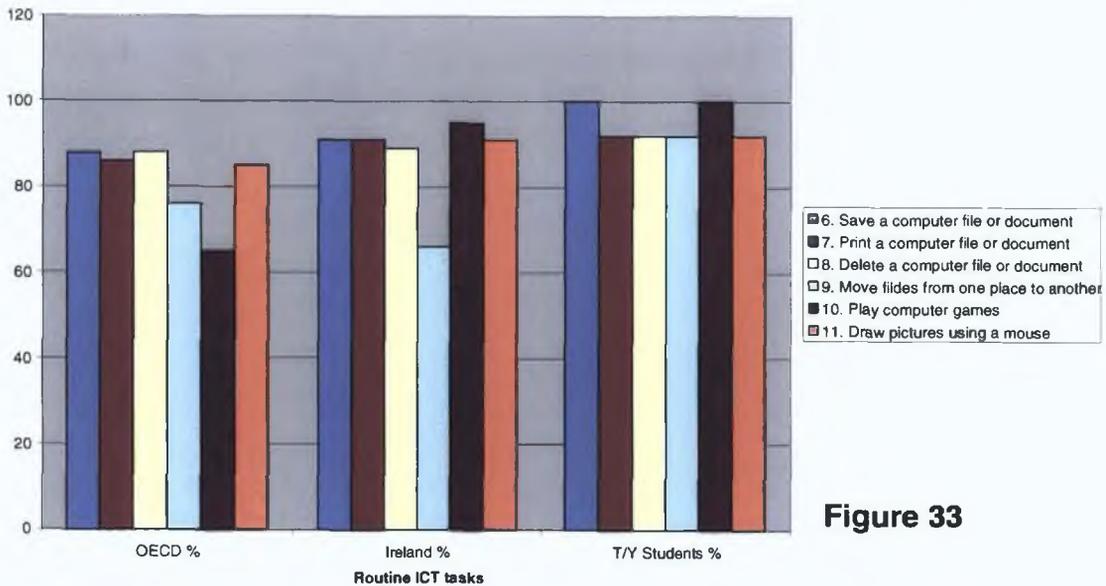


Figure 33

On (10) playing computer games the T/Y Students were 5% higher than the Irish average but 35% higher, the highest difference in this section of the surveys,

than the OECD countries average. 95% of Irish 15-year-olds in the OECD survey and 100% of T/Y Students played computer games as opposed to 65% of the OECD countries average.

(b) Internet usage: OECD data (figure 3.11 p.112) and comparable T/Y Students data show in four out of five areas (1) get onto the internet, (2) copy or download files or documents, (3) attaching a file or document and (5) write and send emails the transition year students score higher than the OECD or Ireland with one 100% response for (5) writing and sending emails.

Table 5

	OECD %	Ireland %	T/Y Students %
1. Get onto the internet	88	87	92
2. Copy or download files from the internet	70	57	77
3. Attach a file to an email message and	58	36	85
4. Download music from the internet	66	55	54
5. Write and send emails	79	70	100

The most notable difference was on (3) attach a file to an email message where the T/Y Students were 49% more able than the Irish average and 27% higher than the OECD.

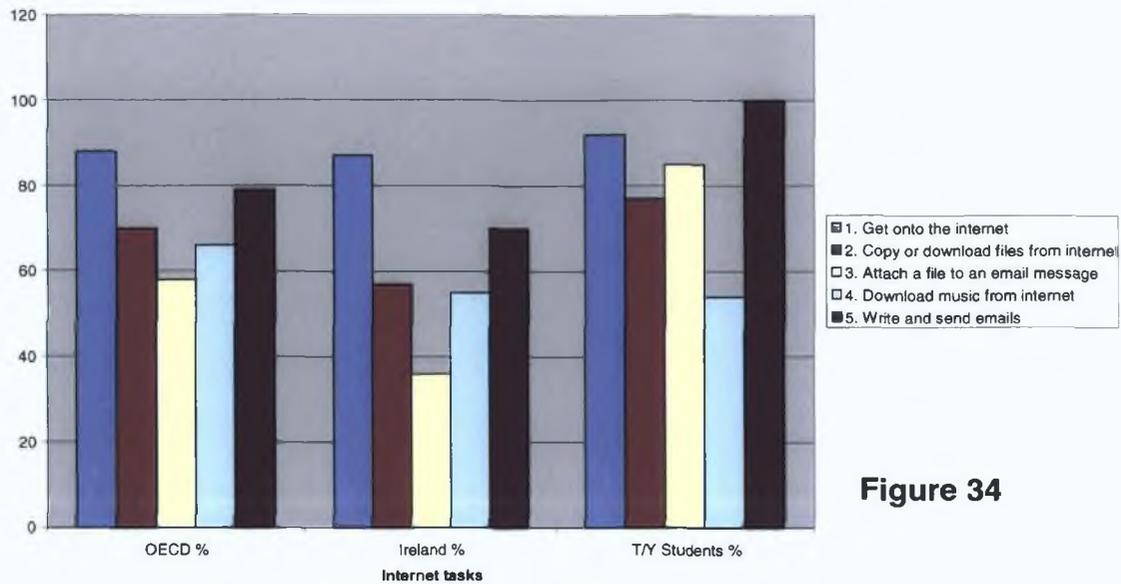


Figure 34

The only area the T/Y Students were lower on was (4) downloading music from the internet, the OECD average was higher 12% and the Irish by 1%.

(c) High-level tasks: OECD data (figure 3.13 p.114) and comparable T/Y Students show in four out of seven areas the T/Y Students scored higher than the OECD and Ireland averages.

Table 6

	OECD %	Ireland %	T/Y Students %
1. Use software to find & get rid of computer viruses	37	28	62
2. Use a database for a list of addresses	52	49	46
3. Create a computer programme eg Logo	21	18	8
4. Use a spreadsheet to plot a graph	44	36	62
5. Create a presentation eg using Powerpoint	47	41	85
6. Create a multimedia presentation	35	28	92
7. Construct a webpage	28	19	15

On (1) using software to find and get rid of viruses the T/Y Students scored 34% higher than Ireland and 25% than the OECD; on (4) using a spreadsheet the T/Y Students were 26% higher than Ireland and 18% than the OECD; on (5) creating

a presentation using Powerpoint the T/Y Students were 44% higher than Ireland and 38% than the OECD and on task (6) creating a multimedia presentation the T/Y Students were 64% higher than Ireland and 57% than the OECD.

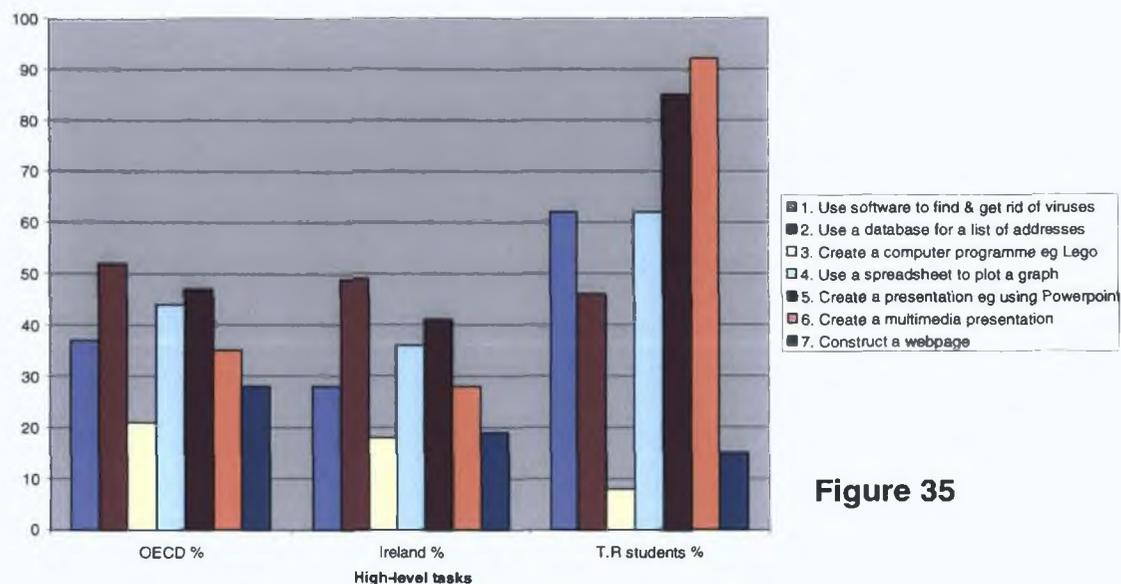


Figure 35

The T/Y Students scored lower for (2) using a database for a list of addresses 3% less than Ireland and 6% less than the OECD; on (3) creating a computer programme such as Logo the T/Y Students were 10% less than the Irish average and 13% less than the OECD one and on (7) constructing a webpage the T/Y Students were 4% less than Ireland and 13% less than the OECD. In high-level tasks the T/Y Students scored higher in four out of seven areas, some dramatically higher, such as *creating a multimedia presentation at 64% more than the Irish average for 15-year-olds and 44% higher than the OECD*. Whereas the areas the T/Y Students scored lower in had narrower findings with 13% the highest value for the less than OECD averages in the areas of creating a computer programme and constructing a webpage.

4. Discussion of findings

4.1 Case Study A

The teacher and pupils in fifth class were very happy with the outcome of the Claymation process in general with the exception of the Irish language element. The pupils found the story difficult to learn and that can be noticed in the lack of fluency in the animation's audio narrative. Another issue that arose concerned the scheduling of Claymation. At the start of the year it had been anticipated that the project would take a fortnight to complete. However due to school holidays and other events such as a fundraising day for ICT equipment and the official ministerial opening of the refurbished school the timetable did not allow for the shorter timescale. It actually ran into five months of work. On the other hand the project succeeded, partly because it was the second year running a number of teachers in the school deployed Claymation, they had an opportunity to build on experience and support each other when difficulties arose. One of the factors the teacher at Scoil Treasa specifically singled out for its success was the excellent back-up from the Digital Hub as well as the May deadline for completion of the animations to enter the film festival.

4.2 Case Study B

The transition year students were very happy with their animation which they described as a comic horror film. They spent considerably less time on Claymation than the primary pupils because they had more out-of-school activities scheduled into the term and the timetable at second level is divided up into 40-minute periods which militates against project work. While there is no evidence that the animation enhanced the curriculum in any particular area the students noted that it was a very good exercise for them in team working and team building and promoted their creativity. The students thought it so good they felt other transition year classes would benefit similar projects.

Note: Re Principals and parents

At the outset it had been planned to survey the opinions of the principals in both schools and, where possible, talk to parents about the ICT initiative. However, it even proved difficult for the teachers to find time to schedule interviews with the researcher not to mind the principals and parents. Both class teachers involved in the case studies participated in the teachers' survey online. The other eight respondents completed the survey on hardcopy. Ten teachers participated in the surveys but there were no opportunities to interview the teachers given their busy schedules and the extra workload of the Claymation projects.

4.3 Pupils' survey

The primary school pupils (12 out of 13) were very positive about their work both by themselves and in the group as a whole in the class sessions for the animation. A small percent felt they did not share ideas with the others nor listen to others' ideas while 17% were unable to say whether pupils listened to each other or not. The latter two findings are interesting because the pupils tended to view the rubric as a test and preferred to give positive ticks for answers whereas those who ticked 'no' or 'can't say' would seem to have reflected more on the meaning of the question and gave an honest appraisal rather than opting for 'correct' answers.

4.4 Teachers' survey

Up to half of the teachers (total 10) had home computers but used them very little for school-related activities compared with personal activities, that reflects the lack of equipment and usage of ICTs in their schools. A clear majority said they get the most information about ICTs in education from a local resource person, in both cases that related to the role of Clifford Brown at the Digital Hub. Their next source is peers (who were participating in ICT initiatives with them) and the internet third. It shows the teachers are dependent on outside advisors and experts to get ICT initiatives up and running.

The top eight issues out of 12 rated over 50% included:

1. More technical back-up 90%
2. More access to the internet 80%
3. More ICT training 70%
4. More curricular-based software 70%
5. More compelling reasons for incorporating ICT in the classroom 60%
6. More curriculum and pedagogic training for integrating ICTs 60%
7. More access to more computers for students 60%
8. More opportunities to work with colleagues to become ICT proficient 60%

The issues echo those of teachers in studies cited in the literature review. The results in the case studies show teachers want to learn more about educational theory in relation to ICTs as well as practical applications, hardware, software and connectivity in Irish schools. In relation to teacher beliefs the majority were positive about the role of ICTs in schools though they did not see electronic media making huge inroads into education in the next five years. This reflects the literature findings in relation to Ireland about the lack of policy, funding and vision about ICTs in Irish education since the Schools IT 2000 initiative ended in 2003. Up to 60% in the teachers' survey did not believe the role of the teacher would change dramatically in the next five years yet 60% said they were better teachers using technology. This suggests that in relation to ICT they are thinking of 'doing new things in old ways' as Prensky (2005) terms it. Up to 60% were optimistic that the internet would help close the digital divide. A total of 70% said they were open to accessing training through the internet/e-learning and 90% had a positive outlook on technology and different learning styles.

There were mixed answers to the number of computers and internet connections per classroom, this could be accounted for by the fact that not all teachers in the survey were classroom teachers, some were resource teachers while some

seem to have answered the question in relation to the computer room in the school rather than their own classroom. The students of these teachers do not do much computer-based school activities, probably because of the lack of technology and internet connections, thus that also rules out online curricular activities. In total 90% of teachers spend less than 45 minutes weekly on school teaching/administrative activities that are not internet based while only 10% spend 46-90 minutes. Up to 70% spend between 1-90 minutes on the internet for school teaching/administrative activities. Yet most rated themselves at stages 3-6 on the instruments for assessing the impact of technology scale. This seems at odds with their practices, stated needs, sources of ICT information and the lack of hardware and software and connectivity in their classrooms as well as some of their beliefs.

4.5 Transition year students & OECD

The transition year survey modeled the ICT questionnaire in the OECD/PISA report. The latter had conducted three surveys and cross-referenced the various data in its findings, thus the raw data for some of the questions was unavailable in a format that could be compared with the Dublin survey. The questions that comparisons could be made showed the Dublin T/Y Students (13 in total) had more access to computers at home and less access at school and in other places than the OECD and Ireland averages. This could relate to the fact that the PISA study was conducted in 2003 and the Dublin survey in 2006, in the intervening years there could have been an increase in the number of computers in students' homes.

A majority of T/Y Students (53.8%) have been using computers for more than five years compared to the Irish average (30%) while (38.5%) of T/Y Students have been using computers for 3-5 years compared to the (30%) Irish figures. There was a significant difference of 32.3% in length of time usage when the two categories >3-5 years are totalled giving **92.3%** for the T/Y Students to **60%** for

the Irish average. The higher Dublin T/Y Students figure may also be accounted for by the three-year time lapse between the two studies, computing at home has become more ubiquitous since then.

Ireland came 20th for 15-year-olds frequently using a computer in the OECD report behind countries that featured in the literature review for ICTs in schools including Canada (1st), Iceland (2nd), Australia (5th), United States (9th), Austria (12th), Finland (14th), Italy (16th), Hungary (18th) and Ireland (20th).

Internet and entertainment: They T/Y Students were 1% under the OECD average for using the internet but 6% higher than the Irish average. The T/Y Students had lower responses for playing games on a computer; downloading software and downloading music from the internet. The T/Y Students were 15% higher than the OECD and 29% higher than Ireland for collaborating with a team on the internet. The T/Y Students also had a 28% and 50% higher rate of using computers for email and electronic communication than the OECD or Ireland averages. This could be due to the increased permeation of email facilities in most western countries in the intervening years since PISA and increased access at home due to the rollout of broadband in Ireland. Collaborating online seems to feature more highly in the Dublin T/Y Students' lives than gaming compared with the OECD and Ireland averages. The T/Y Students don't match OECD levels or Irish averages for downloading software but are closer to Irish rates for downloading music.

Programmes and software: The responses from the T/Y Students about frequency of ICT use were lower in three areas: programming; using the computer to learn school material; using educational software and word processing. The T/Y Students figure was lower by 6% of the OECD for using spreadsheets but the same as Ireland. The only higher figure for frequency of use was by 1% and 5% than the OECD and Ireland respectively for drawing, painting and graphics. This could suggest the T/Y Students use them at school or

it could be that they collaborate more using those those skills. It seems they are not being taught specific programming and software skills at school compared to OECD countries and to a lesser extent Irish levels.

In all 11 areas of **confidence about routine ICT tasks** the Dublin T/Y Students scored higher than the OECD or Ireland averages, four at 100% and seven at 92%. The T/Y Students showed a lot of confidence in this area but playing computer games they were 5% more confident than the Irish average and 35%, the highest difference in this section of the surveys, than the OECD average. 100% of T/Y Students played computer games as opposed to 95% of the Irish average and 65% of the OECD average. However the data also shows that the T/Y Students play games less frequently than the Irish or OECD average.

In four out of five areas **confidence with internet tasks** the T/Y Students score higher than the OECD or Ireland with one 100% response for writing and sending emails. The most notable difference was attaching a file to an email message where the T/Y Students were 49% more able than the Irish average and 27% higher than the OECD. The only area the T/Y Students were lower was downloading music from the internet. The T/Y Students are highly confident about their internet skills performance levels except downloading music which was the most significantly lower figure for the Dublin T/Y Students at 12% below the OECD level.

In four out of seven areas on **confidence with higher-level tasks** the T/Y Students scored higher than the OECD and Ireland averages on higher-level tasks. Using software to find and get rid of viruses the T/Y Students scored 34% higher than Ireland and 25% higher than the OECD; using a spreadsheet the T/Y Students were 26% higher than Ireland and 18% than the OECD; creating a presentation using Powerpoint the T/Y Students were 44% higher than Ireland and 38% than the OECD and creating a multimedia presentation the T/Y Students were 64% higher than Ireland and 57% than the OECD. The T/Y

Students scored lower for using a database for a list of addresses, creating a computer programme such as Logo and constructing a webpage. In high-level tasks the T/Y Students scored some dramatically higher results, such as creating a multimedia presentation at *64% more than the Irish average* for 15-year-olds and *44% higher than the OECD average* whereas the areas the T/Y Students scored lower in and had narrower gaps with 13% the highest value for the less than the OECD averages in the areas of creating a computer programme and constructing a webpage. Either the T/Y Students are more talented in these areas or they rate themselves highly in these areas.

The Dublin T/Y Students mainly access computers at home (92%), all have used computers and they taught themselves about computers (38.5%) and the internet (76.9%) with school a much lower second place at 23.1% and 15.4% respectively which accords with the teachers' survey showing little ICT usage in schools. The T/Y Students are using computers longer than the Irish average in the comparative PISA study. However, a majority (69%) of T/Y Students said they can access computers at school while a sizeable minority (31%) said they can't. When asked about the discrepancy the T/Y Students said they aren't allowed access Bebo and other sites at school therefore they don't see themselves as having access at school in that it is not the access they desire. The percentage of T/Y Students reporting frequency of use of ICT for internet and entertainment was lower than the OECD and Irish averages except for using email facilities and collaborating online which they did at higher levels than the other two categories which could be due to limited computing use in the Dublin school. In frequency of use of ICT for programmes and software the T/Y Students didn't rate as highly as the OECD or Ireland except for using graphics programmes which may also indicate the school's lack of ICTs compared with OECD countries. However in response to how well they performed on 23 tasks the T/Y Students scored the highest in 19 categories. So while the T/Y Students had less frequent access to computers they were more confident about their use in 19 areas but not when using a database, creating a computer programme or constructing a webpage.

5. Future Perspectives

The Claymation projects went from two schools and eight classes taking part in the pilot project stage in 2004/05 to 17 in the Liberties area in its second incarnation. A total of 25 completed movies were made by 10 schools in 2006 and the Digital Hub is collaborating with the School's Completion Programme, Comhairle um Oideachais Gaelscoileanna agus Gaelscolaíochta and the National Council for Technology in Education (NCTE) to expand the project further as it has bought Videoblender software for the education centres and the Digital Hub is planning to establish courses for teachers in the future.

Based on the schoolchildren's upbeat comments in both case studies this should prove a constructive experience for others. However, more research is needed into how best Claymation can enhance specific curricular areas such as oral language learning, on what works best and what doesn't in order that teachers can avoid some of the pitfalls and share the successes.

There is considerable room for more detailed research on the impact of a Claymation initiative in the cognitive, affective and psychomotor domains of the participants to assess a future case for its deployment or otherwise in educational settings. Further studies could also investigate not just the process of making the animations but areas concerned with scripting stories in a second language, classifying and sharing animated resources with others outside the specific classroom or schools.

From the literature and the case studies in this dissertation it is clear there is a need for more ICT usage and more research into its use. Teachers also say they need a grounding in the educational theories that underpin ICT initiatives while principals too need training and opportunities to observe successful teaching with ICT. First order and second order barriers need addressing across the spectrum. While some establishments are experimenting with ICTs in trainee teacher

education the experience is patchy and needs to be prioritized as these college students are the teachers and innovators of tomorrow.

Another area that needs expansion is the role of research in education – teachers undertake little research on their classroom practices and most are unused to being researched - access to teachers, principals and parents for research purposes is quite difficult to maintain for non-teacher researchers. As was noted in the survey teachers only rely on conference papers 7.8% nor journals 0.6% to get information about ICT as much as they do on local resource people 48.9% and their peers 21.7%, therefore they are not familiar with research practices, conventions and the educational uses of peer-reviewed published work. An official research policy, funding for research projects and more teacher participation in research would smooth the path for further investigations of this kind. The presence of a researcher was novel for the children and teachers in both case studies but an outside researcher is dependent on their co-operation for the investigation to take place. Both teachers in this study were very helpful, as was Clifford Brown of the Digital Hub, but there was a risk at one stage that the projects may have been abandoned and a researcher has very little control over that as the class teachers in primary school and transition year in secondary schools have considerable freedom from week to week to decide what activities they prioritise.

Prensky in 2001 said today's students (digital natives unlike their digital immigrant teachers) have not just changed incrementally but that a big discontinuity has taken place with the advent of ICTs. His call on educators to change their methodology and content would most likely be welcomed by all students who are regular users of digital media outside school such as the transition year students. There appears to be a disconnect between the amount of ICT usage at home and at school by the students. Schools run the risk of being viewed as outdated institutions if they don't incorporate more ICT into curricular areas. Claymation is one project that can enhance exposure to ICT and

both sets of classes, and all those other schools at the film festival said they enjoyed the process and were pleased with their products.

Holmes et al (2001) echo Prensky's call for change by arguing for a new vision for learning and a national plan for learning in order that Ireland "leapfrog" other nations and become a model for "constructive, cost-effective use of ICT to support and enhance learning". Without that vision projects like Claymation run the risk of being one-off events and the knowledge and expertise built up by teachers and pupils run the risk of being dissipated if the teachers change jobs or if they have no back-up from places like the Digital Hub.

In an address to the Computer Education Society of Ireland February 10th 2006 Dr. Conor Galvin outlined three areas teachers could priorities to make that vision a reality in education:

1. Use technology more imaginatively and in ways match the 'always-on' generation
2. Join/find/make networks of teachers who are interested in the smart usage of ICT and who will support each other by developing user capability, novel projects, materials and resources that can be shared with others.
3. Take risks; from the school to the Department of Education and Science.

While teachers await a policy on ICT they can link up with others to develop projects and experiment with ICT initiatives that are engaging for their pupils.

In the literature Redmond & Brown (2004) called on teachers to take risks by adopting a "fearless" attitude in the use of ICT. However in order to do that teachers say they must have an idea of where it is they are going. A road map is needed for the ICT journey. Nicol & Watson (2003) say what is required is "to map ICT on to existing practices and to extend them in terms of the needs of both teachers and pupils in an evolutionary and not revolutionary strategy".

What is clear is the ICT innovation in Irish schools has only started out on the journey. It can learn from countries that have more developed ICT visions, policies and strategies put in place. It can build on the successes of projects such as the Claymation ones initiated by the Digital Hub and others led by the NCTE and their network of ICT advisors. The leaders in education in Ireland need to listen not only to educators and others but also to the voices of industry experts. The Expert Group on Future Skills Needs, the Irish Business and Employers' lobby group ICT Ireland and global corporations such as Microsoft and Hewlett Packard have all published and submitted to Government well-thought out arguments as to why ICT issues need to be pushed to the top of the educational agenda. ICT in schools is taking place in a vacuum since the Schools IT 2000 SIPs were wound down in 2003 and the Department of Education and Science have failed to date to bring out a new policy for the area. The last educational policy was in 1997 and effectively there has been no update in the intervening years despite the fact that computing and connectivity are getting more ubiquitous at home and at school. There are grounds for optimism though as the roll-out of broadband in schools is well underway and the majority of schools will be connected to a national network by the end of this year.

References

Abbott, C., Lachs, V. and Williams, L., 2001. Fool's gold or hidden treasure: are computers stifling creativity? *Journal of Education Policy*, 16(5), pp. 479-487.

Aspden, L. & Pountney, R. (2002). Community and constructivism: implicit pedagogical models in virtual learning. In Richards, G. ed., *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education (SITE 2002)*. pp.2043-2046.

Ausubel, D. (1963). *The Psychology of Meaningful Verbal Learning*. New York: Grune & Stratton.

Bailey, F., & Pransky, K. (2005). Are "Other People's Children" Constructivist Learners Too? *Theory Into Practice*, 44(1), pp. 19-26.

Baker, a. 2003. ICT in schools. *Education Journal*, pp. 1p.

Bandura, A. (1997) *Self-efficacy: The exercise of control*. New York: Freeman.

Bassegy, M. (1999). *Case Study Research in Educational settings*. Buckingham: Open University Press.

Binet, A. (1905) New Methods for the Diagnosis of the Intellectual Level of Subnormals, First published in *L'Année Psychologique*, 12, 191-244.

Blaxter, L., Hughes, C. & Tight, M. (2002). *How to Research*, Open University Press, Buckingham, England.

Bloom, B. S. (1956) *Taxonomy of Educational Objectives, Handbook 1: Cognitive Domain*. New York, Longman.

Bratengeyer, E., Dorninger, C., Haller, P., Rieder, K. & Schafleitner, V. (2003). eTeaching in Austrian Schools. In Crawford, C., Willis, D., Carlsen, R. Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2003*. pp.3255-3256.

Chatterton, J. & Willan, C. (2002). Teaching and Learning in Information and Communication Technology and Modern Foreign Languages. In Crawford, C., Willis, D., Carlsen, R. Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2002*. pp.1024-1028.

Clifford, P. & Friesen, S. (2002). The Challenge of Turning Professional Development into Professional Practice. In Richards, G. ed. *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2002*. pp.2484-2486.

Comber, C. & Lawson, T. (2002) Breaking the ICT barrier: Challenges and opportunities on the way to the integrative school. *International Conference on Information and Communication Technologies in Education (ICTE)*, 2002, Badajoz, Spain.

Comber, C. & Lawson, T. (2003). Education for Managing ICT: Professional Development for School Leaders. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2003*. (pp. 1274-1281).

Darling-Hammond, L. H, and Aness, J. & Wichterle Ort, S. (2002). Reinventing High School: Outcomes of the Coalition Campus Schools Project, *American Educational Research Journal*, Fall 2002, Vol. 39, No. 3, pp. 639–673

Delargey, M. J. (2003). Pedagogical Based ICT Training in Initial Teacher Education, EdTech 2003, 4th annual Irish EdTech users conference, Waterford, Ireland, May 22-23rd 2003.

Dewey, J. (1938). *Experience and Education*, New York. Touchstone, Reprint 1997.

Dibbon, D. (2003). GrassRoots: The Diffusion of an Innovation. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds., *SITE 2003*. pp. 910-913.

Elliott, A. (2003). Scaffolding ICT practices in pre-service teacher education programs. A model for success. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds., *SITE 2003*. pp.3507-3513.

Ferguson, D. (2001). Technology in a Constructivist Classroom. *Technology in Childhood Education Annual*, ITCE 2001.

Fetherston, T. (2004). Why Should We Use ICT in Teaching and Learning? In Crawford, C., Willis, D., Carlsen, R. Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2004*. pp.1154-1157.

Freeman, E. Holmes, B, & Tangney, B. (2001) ICTs for Learning - An International Perspective on the Irish Initiative. In Crawford, C., Willis, D., Carlsen, R. Gibson, I., McFerrin, K., Price J. & Weber R. eds., *SITE 2001*. pp.1269-1274.

Gardner, H. (1983). *Frames of Mind: The theory of multiple intelligences*. New York: BasicBooks. Tenth Anniversary Edition with new introduction, New York: BasicBooks, 1993.

Gardner, H. (1993) *Multiple Intelligences: The Theory in Practice?* New York: BasicBooks.

Gagne, R. (1985). *The Conditions of Learning* (4th ed.). New York: Holt, Rinehart & Winston.

Gobbo, E. & Torrebruno, A. (2003). Technologies and Diseases: Computer as a Support in the School System. Two Case Studies from the Discotech Project. In Kommers, P. & Richards, G. eds., *Proceedings of World Conference on*

Educational Multimedia, Hypermedia and Telecommunications 2003. pp.2368-2369.

Hargreaves, A. (2004). *Teaching in the knowledge society, education in the age of insecurity*. OUP, (1st ed 2003). Series editors Goodson, I. & Hargreaves, A.

Hargreaves, D. H. (2003). *Education Epidemic, Transforming secondary schools through innovation networks*. London. Demos.

Harris, S. (2002). Innovative pedagogical practices using ICT in schools in England. *Journal of Computer Assisted Learning*, 18(4), pp. 449-458.

Herrnstein, R., & Murray, C. (1994). *The bell curve: Intelligence and class structure in American life*. New York. Free Press.

Hjartarson, T. & Jakobsdottir, S. (2003). LearnICT – ICT and Dynamics of Change in Icelandic Schools. In Kommers, P. & Richards, G. eds., *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2003*. pp. 2821-2824.

Holmes, B., FitzGibbon, A., Mehan, S. Savage, T. & Tangney, B., (2001). Communal Constructivism: Students constructing learning for as well as with others. In Crawford, C., Willis, D., Carlsen, R. Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2001*. pp. 3114-3119.

Holmes, B., Savage, T. & Tangney, B (eds). (2000) A Report Commissioned by the Lifelong Learning Group Of The Information Society Commission. *Comparative International Research on Best Practice and Innovation in Learning*.

Huovinen, L. (2001). Developing Virtual Learning Environments: Finnish Information Strategy for Education and Research 2000-2004. In Kommers, P. & Richards, G. eds., *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications*. 2001 pp. 798-802.

Kane, C. (2002). WebKANeCts - Building on constructivism to create a learning-centred strategy for e-learning. In Richards, G. ed., *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2002*. (pp. 1693-1696).

Karpati, A. (2003). ICT and the Quality of Learning at Hungarian School - Results of the OECD Study. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2003*. pp.980-983.

Keengwe, J, & Hofmeister, D. Using Technology to enhance meaningful learning experiences in the classroom – a constructivist perspective. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds., *SITE 2004*. pp. 1225-1227.

Kirkpatrick, D.L. (1994). *Evaluating Training Programs: The Four Levels*. San Francisco, CA: Berrett-Koehler.

Kolk, M. (2002). Teaching with Clay Animation, Unleash Creativity and Imagination. Tech4Learning Inc.

Kylämä, M. & Silander, P. (2001). Revolution of the Pedagogical Use of ICT by Influencing the Whole School Community. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds., *SITE 2001*. pp. 995-998.

Lennox, L. (2003). Technology Field Experience in Appalachian K-12 schools. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2001*. pp. 3649-3652.

Lim, C. & Khine, M. (2006). Managing Teachers' Barriers to ICT Integration in Singapore Schools. *Journal of Technology and Teacher Education*. 14 (1), pp. 97-125.

Lim, C.P. (2002). A theoretical framework for the study of ICT in schools: a proposal. *British Journal of Educational Technology*, 33(4), pp. 411-421.

Litton, E. (2002). Bridging the digital divide: A school's success story. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2002*. pp. 389-393.

Loveless, A., Taylor, T. & Millwood, R. (2001). Creative uses of digital technology: Developing visual literacy and ICT capability. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2001*. pp.2376-2380.

McFarlane, A. (2001). Perspectives on the relationships between ICT and assessment. *Journal of Computer Assisted Learning*, 17(3), pp. 227-234. McFerrin, J. Price & R. Weber (Eds.), *SITE 2001* pp.1269-1274.

McKibben, D., & McDonald, S., Holmes, B., Tangney, B. (2001). Reflections on the Impact of ICT on Teacher Education. *SITE 2001*, pp. 947-952.

McNicol, S., Ghelani, T. and Nankivell, C., (2002). ICT and resource-based learning: implications for the future. *British Journal of Educational Technology* 33 (4), pp. 393-402.

Murphy, C & Greenwood, I. (1998) Effective Integration of Communication and Technology in Teacher Education. *Journal of Information Technology in Education*, 7 (3) 413-429.

Murphy, C. (2000). Effective Use of ICT by Student Teachers – Is It Improving? In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2000*. pp.1656-1661.

Nichol, J. & Watson, K. (2003). Editorial: Rhetoric and reality: The present and future of ICT in education. *British Journal of Educational Technology*, 34(2), pp. 131-136.

Orhun, E. (2004). Information and Communication Technology Innovation in Education in Turkey: A Study of the Implementation Phase of the Computer-

Aided Education Project. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2004*. pp.1332-1338.

Otto, T. & Albion, P. (2004). Principals' Beliefs about Teaching with ICT: A Model for Promoting Change. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2004*. pp.1620-1627.

Pearson, T. & Swain, C. (2001). The Digital Divide in Schools: We Can Make a Difference. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2001*. pp.371-376.

Piaget, J. (1954). *Construction of reality in the child*, London: Routledge & Kegan Paul, 1954.

Postman, N. (2005 Reprint). *Amusing Ourselves to Death, Public Discourse in the Age of Show Business*. 1985. New York. Penguin Books.

Raymond, E.S. (1999). *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*. O'Reilly & Associates. Sebastopol, CA.

Redmond, P. & Albion, P. (2002). In their own words: preservice teachers' perceptions of ICT integration. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds., *SITE 2002*. pp.2426-2430.

Redmond, P. & Brown, K. (2004). Are we there yet? The journey of ICT integration. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds., *SITE 2004*. pp. 1001-1008.

Riel, M. & Schwarz, J. (2002). School Change with Technology: Crossing the Digital Divide. *Information Technology in Childhood Education Annual*. 2002 (1), pp. 147-179.

Scrimshaw, P. & Weber, R. (2003). Teaching, Learning and ICT/Ed Tech in Schools: Is Communal Constructivism the Best Approach? In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2003*. pp. 2497-2501.

Selinger, M. (2000). Developing a Cross-Curricular Focus to ICT Teaching. In Crawford, C., Willis, D., Carlsen, R., Gibson, I., McFerrin, K., Price J. & Weber R. eds. *SITE 2002*. pp. 1270-1275.

Stoll, C. (2000). *High-Tech Heretic, Reflections of a Computer Contrarian*, Anchor Books, New York.

Toots, A. & Lanpere, M. (2004) Tiger in Focus - a National Survey of ICT in Estonian Schools. *Educational Media International*, Mar 2004, Vol. 41 Issue 1, p7-18.

Wellington, J. (2001). Exploring the Secret Garden: the growing importance of ICT in the home. *British Journal of Educational Technology*, 32(2), pp. 233.

Yelland, N. & Lloyd, M. (2001). Virtual Kids of the 21 st Century: Understanding the Children in Schools Today. *Information Technology in Childhood Education Annual*. 2001 (1), pp. 175-192.

Reports:

Are Students Ready for a Technology-Rich World? What PISA Studies Tell Us, OECD 2005. pgs 84-87. Access to and Use of ICT and Their Performance in PISA 2003

http://www.oecd.org/document/14/0,2340,en_2649_34515_36002382_1_1_1_1_00.html [Accessed 13 May 2006]

Department of Education & Science. (2004). Annual Report 2004 – Scientific and Technological Education (Investment) Fund).

Department for Education and Skills. (2001) *Impact2: Emerging Findings from the Evaluation of the Impact Information and Communications Technology on Pupil Attainment*, DfES, London.

The National Council for Curriculum and Assessment's curriculum review. Phase 1 May 2005.

DES, Annual Report 2004 – Scientific and Technological Education (Investment) Fund.

Websites:

Galvin (2002) <http://belfield.blogs.ie/cesi2006> [Accessed 13 May 2006]

http://www.cmec.ca/stats/pcera/rsevents02/Ireland_EN.pdf [Accessed 13 May 2006]

Gardner, H. (1995). Cracking Open the IQ Box, *The American Prospect* no. 20 (Winter 1995): 71-80 [Accessed 13 May 2006]

<http://www.psych.utoronto.ca/~reingold/courses/intelligence/cache/20gard.html>

Gottfredson, Linda. S. Mainstream Science on Intelligence: An Editorial with 53 Signatories, History and Bibliography. *Intelligence* 24 (1) 13-23. <http://www.udel.edu/educ/gottfredson/reprints/1997mainstream.pdf> [Accessed 13 May 2006]

Kirkpatrick <http://coe.sdsu.edu/eet/articles/k4levels/index.htm> [Accessed 13 May 2006]

Prensky 2005 [Accessed 13 May 2006]

http://www.edutopia.org/magazine/ed1article.php?id=Art_1423&issue=dec_05#

Prensky 2001 [Accessed 13 May 2006]

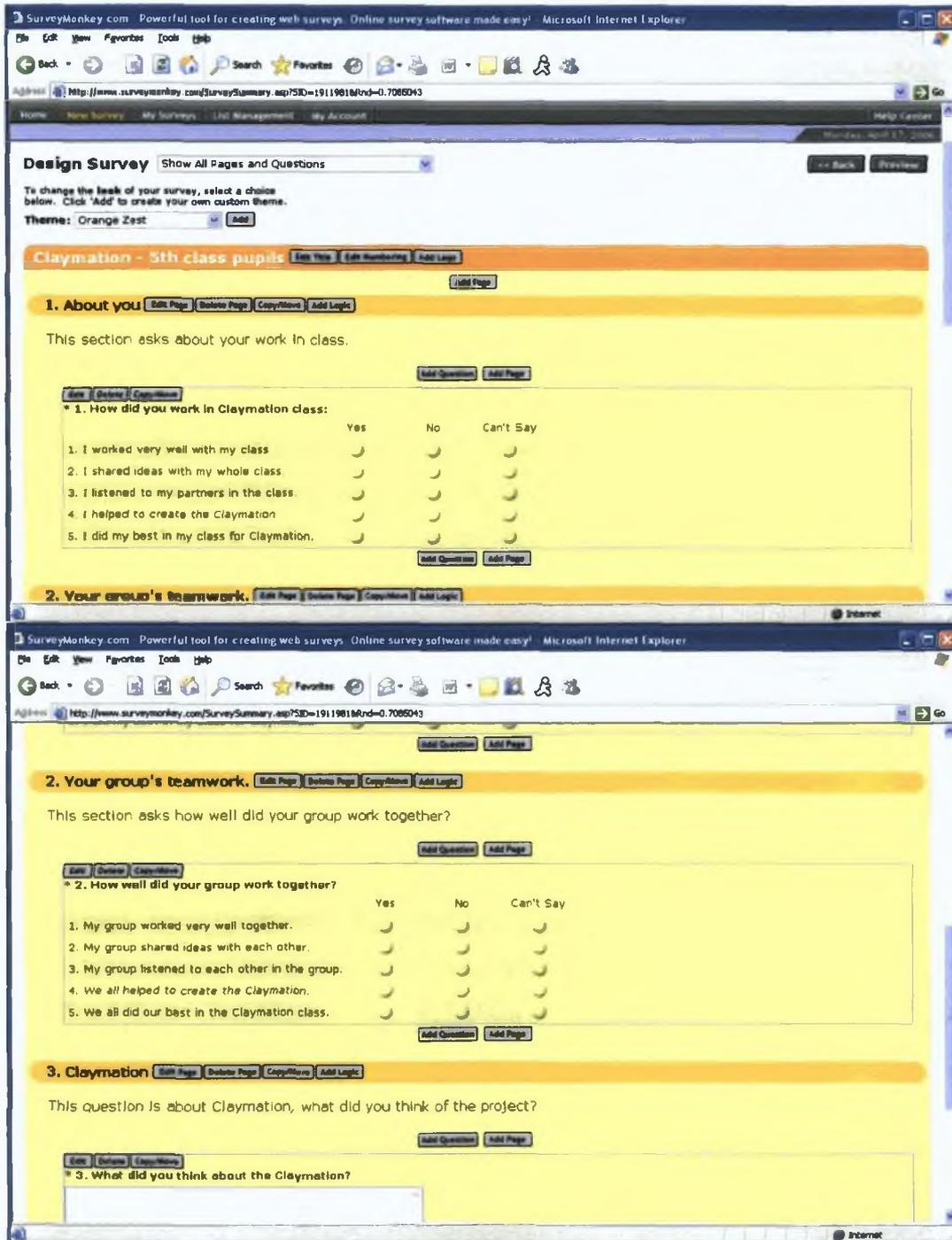
<http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf>

Appendices

Appendix 1: Pupils' Survey Screenshots

<http://www.surveymonkey.com/SurveySummary.asp?SID=1911981&Rnd=0.2987>

846



Appendix 2: Teachers' Survey Screenshots

<http://www.surveymonkey.com/SurveySummary.asp?SID=1911877&Rnd=0.4681602>

SurveyMonkey.com Powerful tool for creating web surveys. Online survey software made easy! Microsoft Internet Explorer

Address: <http://www.surveymonkey.com/SurveySummary.asp?SID=1911877&Rnd=0.4681602>

SurveyMonkey.com because knowledge is everything

Home New Surveys My Surveys Job Management My Account Help Center

Monday, April 17, 2006

Design Survey Show All Pages and Questions [Go Back] [Preview]

To change the look of your survey, select a choice below. Click 'Add' to create your own custom theme.

Theme: Light Olive [Add]

Teachers & Technology: A Snap-Shot Survey [Edit Theme] [Edit Questions] [Add Page]

[Add Page]

1. About you! [Edit Page] [Delete Page] [Copy/Move] [Add Logic]

This survey provides a snap shot of how prevalent technology is in education today, and what you, as an educator, believe about the technology. It is being done as part of a Masters In Learning Technology by Mary O'Carroll for the National College of Ireland.

[Add Question] [Add Page]

[Edit] [Delete] [Completion] [Add Logic]

* 1. Q1. Do you have a computer at home that you use for school related:

- email
- internet
- other school activities
- Other (please specify)

[Add Question] [Add Page]

SurveyMonkey.com Powerful tool for creating web surveys. Online survey software made easy! Microsoft Internet Explorer

Address: <http://www.surveymonkey.com/SurveySummary.asp?SID=1911877&Rnd=0.4681602>

[Edit] [Delete] [Completion] [Add Logic]

* 2. Do you have a computer at home that you use for personal:

- email
- internet
- other activities
- Other (please specify)

[Add Question] [Add Page]

[Edit] [Delete] [Completion]

3. What percentage of the information you receive about teaching with technology is from:

Conferences	<input type="text"/>
Local resource person	<input type="text"/>
Peers/colleagues	<input type="text"/>
Research journals	<input type="text"/>
Teacher magazines	<input type="text"/>
Internet	<input type="text"/>

[Add Question] [Add Page]

2. You & ICT [Edit Page] [Delete Page] [Copy/Move] [Add Logic]

This section asks 12 questions about your needs vis a vis teaching with technology, rate your answers from less to more urgent as you see fit.

[Add Question] [Add Page]

Appendix 2 continued

SurveyMonkey.com Powerful tool for creating web surveys. Online survey software made easy! Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Home Print Mail

Address http://www.surveymonkey.com/SurveySummary.asp?SID=1911877&rd=0.6618077

2. You & ICT Edit Page Delete Page Copy/Share Add Links

This section asks 12 questions about your needs vis a vis teaching with technology, rate your answers from less to more urgent as you see fit.

Add Question Add Page

Edit Delete Copy/Share

4. What if anything do you need to make ICT an integral part of your school or classroom's curricular activities?

	1 less urgent	2	3 neither	4	5 more urgent
1. Need more time to learn to use computers and the internet	<input type="radio"/>				
2. Need more time to change the curriculum to better incorporate ICT	<input type="radio"/>				
3. Need more ICT training	<input type="radio"/>				
4. Need more training with curriculum & pedagogy that integrates ICT	<input type="radio"/>				
5. Need access to more computers for my students	<input type="radio"/>				
6. Need more access to the internet	<input type="radio"/>				
7. Need more software that is curricular-based	<input type="radio"/>				
8. Need more technical support to keep the computers working	<input type="radio"/>				
9. Need more resources that illustrate how to integrate technology into the curriculum	<input type="radio"/>				
10. Need to be able to try out ICT-enhanced curriculum units in my classrooms several times before I am comfortable with them	<input type="radio"/>				
11. Need more opportunities to work with colleagues to become more proficient using ICT-enhanced curriculum units	<input type="radio"/>				
12. Need more compelling reasons why I should incorporate ICT into the classroom	<input type="radio"/>				

Add Question Add Page

Internet

SurveyMonkey.com Powerful tool for creating web surveys. Online survey software made easy! Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Home Print Mail

Address http://www.surveymonkey.com/SurveySummary.asp?SID=1911877&rd=0.6618077

Edit Delete Copy/Share

5. Please indicate the answer that best reflects your belief where:

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
1. I believe that textbooks will be replaced by electronic media within 5 years.	<input type="radio"/>				
2. I believe that the role of schools will be dramatically changed because of the Internet within 5 years.	<input type="radio"/>				
3. I believe that the role of the teacher will be dramatically changed because of the Internet within 5 years.	<input type="radio"/>				
4. I believe that I am a better teacher with technology.	<input type="radio"/>				
5. I believe that the Internet will help narrow the societal gap between the "haves" and "have nots".	<input type="radio"/>				
6. If my district offered Internet based professional development activities, I would use them.	<input type="radio"/>				
7. Student time on the Internet is time well spent.	<input type="radio"/>				
8. Technology can help accommodate different learning styles.	<input type="radio"/>				

Add Question Add Page

3. Your class Edit Page Delete Page Copy/Share Add Links

About students in your class.

Add Question Add Page

Edit Delete Copy/Share

6. What is the number of computers per classrooms:

Add Question Add Page

Internet

Appendix 2 continued

SurveyMonkey.com Powerful tool for creating web surveys. Online survey software made easy! Microsoft Internet Explorer

Back - Forward - Stop - Home - Search - Favorites - Print - Mail - Share

Address http://www.surveymonkey.com/SurveySummary.asp?SID=1911877&Rnd=0.6618877

7. What is the number of Internet connections per classrooms:

[Add Question](#) [Add Page](#)

8. Students engage in computer-based activities (but not Internet) for curricular purposes:

0 mins pw < 15 mins pw 15-45 mins pw 46-90 mins pw > 90 mins pw

[Add Question](#) [Add Page](#)

9. Students engage in Internet-based activities for curricular purposes:

0 mins pw < 15 mins pw 15-45 mins pw 46-90 mins pw > 90 mins pw

[Add Question](#) [Add Page](#)

10. Do you have compatible computers at home and school?

[Add Question](#) [Add Page](#)

11. Do you have a laptop?

[Add Question](#) [Add Page](#)

SurveyMonkey.com Powerful tool for creating web surveys. Online survey software made easy! Microsoft Internet Explorer

Back - Forward - Stop - Home - Search - Favorites - Print - Mail - Share

Address http://www.surveymonkey.com/SurveySummary.asp?SID=1911877&Rnd=0.6618877

12. How many minutes do I use the computer (but not Internet) in my teaching/administrative activities:

0 mins pw < 15 mins pw 15 - 45 mins pw 46 - 90 mins pw > 90 mins pw

[Add Question](#) [Add Page](#)

13. How many minutes do I use the Internet in my teaching/administrative activities:

0 mins pw < 15 mins pw 15-45 mins pw 46-90 mins pw > 90 mins per week

[Add Question](#) [Add Page](#)

4. ICT adoption stages [Edit Page](#) [Delete Page](#) [Copy/Move](#) [Add Logic](#)

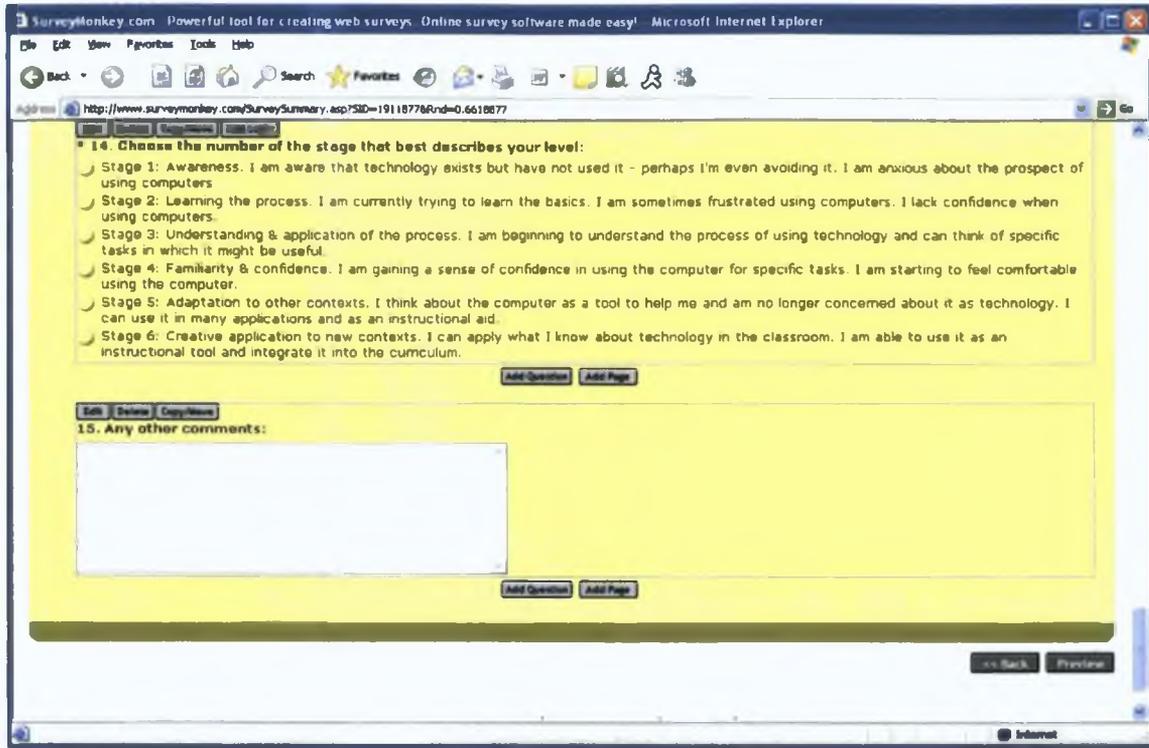
Each of the six stages below relate to the adoption of ICT/technology in schools.

[Add Question](#) [Add Page](#)

14. Choose the number of the stage that best describes your level:

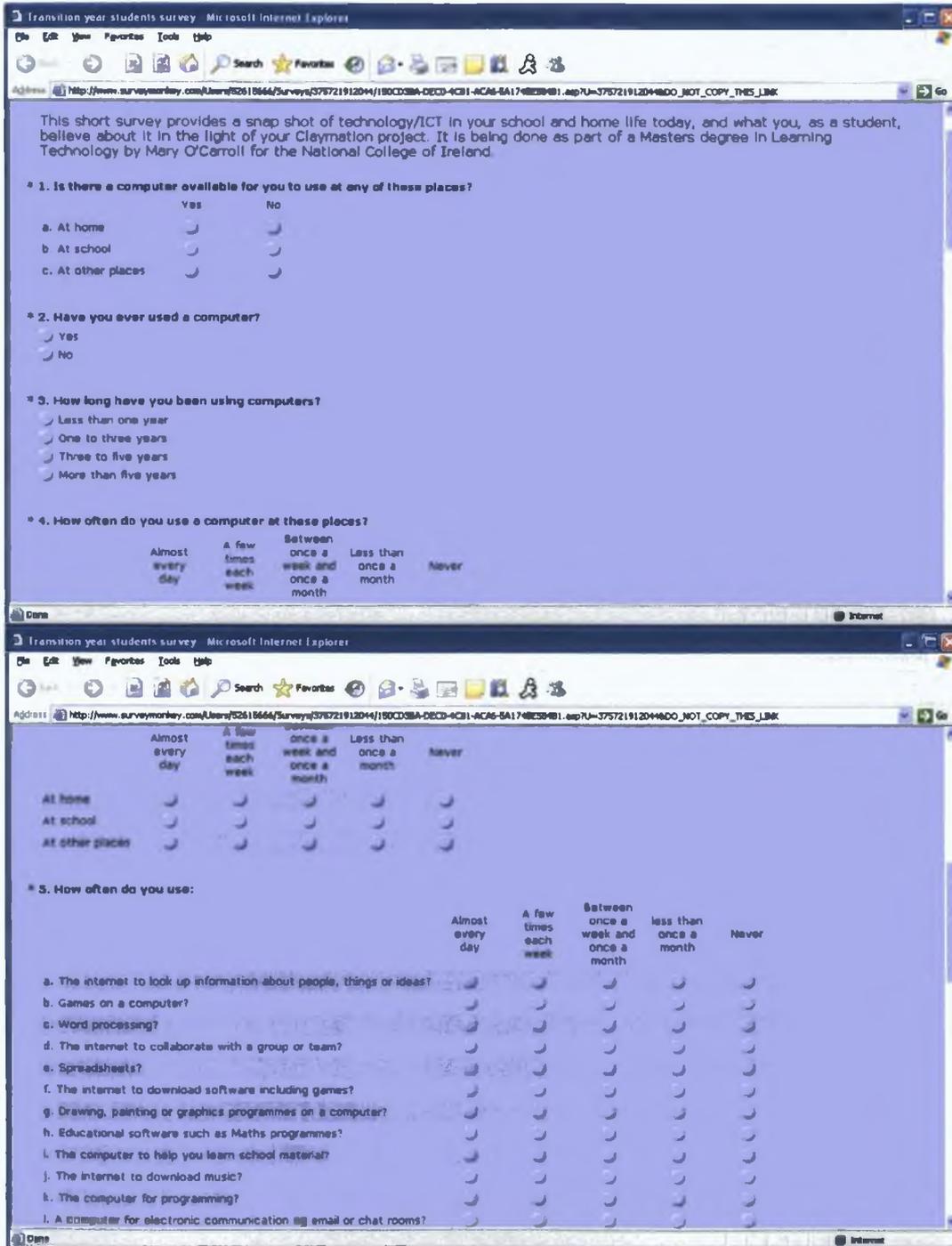
- Stage 1 Awareness. I am aware that technology exists but have not used it - perhaps I'm even avoiding it. I am anxious about the prospect of using computers.
- Stage 2 Learning the process. I am currently trying to learn the basics. I am sometimes frustrated using computers. I lack confidence when using computers.
- Stage 3 Understanding & application of the process. I am beginning to understand the process of using technology and can think of specific tasks in which it might be useful.
- Stage 4 Familiarity & confidence. I am gaining a sense of confidence in using the computer for specific tasks. I am starting to feel comfortable using the computer.
- Stage 5 Adaptation to other contexts. I think about the computer as a tool to help me and am no longer concerned about it as technology. I can use it in many applications and as an instructional aid.
- Stage 6 Creative application to new contexts. I can apply what I know about technology in the classroom. I am able to use it as an

Appendix 2 continued



Appendix 3: Transition Year Students Survey Screenshots

<http://www.surveymonkey.com/SurveySummary.asp?SID=1912044&Rnd=4.530972E-02>



Appendix 3 continued

Transition year students survey Microsoft Internet Explorer

Address: http://www.surveymonkey.com/Users/82618M4/Surveys/375721912044/150CD38A-DECD-4CB1-AC46-5A1748E5D4B1.asp?U=375721912044&DO_NOT_COPY_THIS_LINK

6. How well can you do each of these tasks on a computer?

	I can do this very well by myself	I can do this with help from someone	I know what this means but I cannot do it	I don't know what this means
a. Start a computer game?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Use software to find out and get rid of computer viruses?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Open a file?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Create/edit a document?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Scroll a document up and down a screen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Use a database to produce a list of addresses?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Copy a file from a floppy disk?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Save a computer document or file?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Print a computer document or file?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Delete a computer document or file?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Move files from one place to another on a computer?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. Get on to the internet?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. How well can you do each of these tasks on a computer?

	I can do this very well by myself	I can do this with help from someone	I know what this means but I cannot do it	I don't know what this means
m. Copy or download files from the internet?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. Attach a file to an email message?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o. Create a computer programme eg in Logo, Pascal, Basic?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p. Create a spreadsheet to plot a graph?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q. Create a presentation eg using Powerpoint?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
r. Play computer games?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
s. Download music from the internet?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
t. Create a multi-media presentation (with sound, pictures, video)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
u. Draw pictures using a mouse?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
v. Write and send emails?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
w. Construct a Web page?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Who taught you most about how to use computers?

9. Who taught you most about how to use the internet?

Transition year students survey Microsoft Internet Explorer

Address: http://www.surveymonkey.com/Users/82618M4/Surveys/375721912044/150CD38A-DECD-4CB1-AC46-5A1748E5D4B1.asp?U=375721912044&DO_NOT_COPY_THIS_LINK

7. How well can you do each of these tasks on a computer?

	I can do this very well by myself	I can do this with help from someone	I know what this means but I cannot do it	I don't know what this means
m. Copy or download files from the internet?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. Attach a file to an email message?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o. Create a computer programme eg in Logo, Pascal, Basic?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p. Create a spreadsheet to plot a graph?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q. Create a presentation eg using Powerpoint?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
r. Play computer games?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
s. Download music from the internet?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
t. Create a multi-media presentation (with sound, pictures, video)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
u. Draw pictures using a mouse?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
v. Write and send emails?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
w. Construct a Web page?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Who taught you most about how to use computers?

9. Who taught you most about how to use the internet?

Appendix 3 continued

SurveyMonkey.com Powerful tool for creating web surveys. Online survey software made easy! Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Print Mail

Address http://www.surveymonkey.com/SurveySummary.asp?SID=1912044&Rnd=0.6474881

2. Claymation

This section is about the Claymation project. There are two questions.

[Add Question](#) [Add Page](#)

[Edit](#) [Delete](#) [Copy/Move](#) [Add Links](#)

10. Are you:

Male?

Female?

[Add Question](#) [Add Page](#)

[Edit](#) [Delete](#) [Copy/Move](#)

11. What did you think about the Claymation project?

Storyboarding the scenes:

Artwork:

Camera work:

Editing:

Sound:

Group work:

Overall:

[Add Question](#) [Add Page](#)

[Edit](#) [Delete](#) [Copy/Move](#)

12. What did you think about the Claymation project?

SurveyMonkey.com Powerful tool for creating web surveys. Online survey software made easy! Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Print Mail

Address http://www.surveymonkey.com/SurveySummary.asp?SID=1912044&Rnd=0.6474881

Storyboarding the scenes:

Artwork:

Camera work:

Editing:

Sound:

Group work:

Overall:

[Add Question](#) [Add Page](#)

[Edit](#) [Delete](#) [Copy/Move](#)

12. What did you think about the Claymation project?

[Add Question](#) [Add Page](#)

[Back](#) [Preview](#)

[SurveyMonkey is Mobile!](#) [Privacy Statement](#) [Contact Us](#) [Logout](#)

Copyright © 2009 SurveyMonkey Inc. All Rights Reserved.
No portion of this site may be copied without the express written consent of SurveyMonkey.com.