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An investigation into decision making within secondary schools on Information and Communications Technology inside the same Northern county of England

Declaration page

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Abstract

In 1997, New Labour introduced a national ICT strategy for schools and went on to spend over £3.54 billion on educational technology. This exploratory study examines whether changes to government funding for educational technology has altered the view of the role of ICT in the thinking of senior leaders. It contrasts views of the role of ICT in the classroom from those in the 'Edutopian' school (Chen and Armstrong, 2002) who see it as transformational, innovative and an essential part of preparing children for modern life, with those who adopt a more cautious 'Dystopian' narrative as found across the work of a range of academics, such as, Cuban (2001), Selwyn (1999, 2002, 2004, 2008, 2011, 2014) and Facer (2011). This exploratory study draws on a small sample of interviews with key decision makers based in different schools that are all located within a single county in the North of England.

The findings suggest that ICT remains one of the top five spending priorities for schools who explain this with the use of the Edutopian globalisation and economic arguments. In the study, a minority of key decision makers for ICT had formal training and this was reflected in the range of processes and procedures they adopted. The movement by government away from a centralised planning approach was welcomed across the sample and the loss of some ring-fenced funds was deemed by the 'rural schools' to have improved outcomes and created solutions more attuned to local requirements. Edutopian arguments were used by all participants to explain their planning and vision for the future with some desiring to move to ubiquitous or 1:1 tablet teaching solutions.

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List of abbreviations

BECTA – British Educational Communications and Technology Agency
BESA – British Educational Suppliers Association
BETT – British Educational Training and Technology Show
BSF – Building Schools for the Future
BYOD – Bring your own device
CAS – Computing at School
CBI – Confederation of British Industry
CPD – Continuous Professional Development
DFE – Department for Education
DFES – Department for Education and Skills
D&T – Design and Technology
ERA – Education Reform Act
GTC – General Teaching Council
ICT – Information and Communications Technology
JISC - Joint Information Systems Committee
MFL – Modern Foreign Languages
MLE – Managed Learning Environment
NCSL – National College for School Leadership
NERP – National Education Research Panel
NAACE – National Association of Advisors for Computers in Education
NESTA – National Endowment for Science, Technology and the Arts
NGA – National Governors Association
PARS – Pupil Achievement and Records System
PLE – Personal Learning Environment
QCDA – Qualifications and Curriculum Development Agency
QUANGO – Quasi-autonomous non-governmental organisation
RFID – Radio Frequency IDentification
SAM – Self assessment method learning
SAT – Standard Attainment Test
SecEd – Secondary Education
SIMS – Student Information and Management System
SLICT – Strategic Leadership of Information and Communications Technology
SSAT – Specialist Schools and Academies Trust
TCO – Total Cost of Ownership
TPIAG – Teenage Pregnancy Independent Advisory Group
VLE – Virtual Learning Environment

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Acknowledgements

In a recent life of the American theologian Charles Hodge, the author cites him as saying that his debt to his mother was 'beyond all estimate', commenting that, 'he wrote, 'to our mother, my brother and myself, under God owe absolutely everything. To us she devoted her life. For us she prayed, laboured and suffered' (Hoffecker, 2011:34). It was a sentiment that struck me as I read it, because it was one with which I could associate. My own mother was one of a small group of girls from a working class town in the North of England to go to University. Her matriculation, from Keele, in 1970, was sufficiently unusual to make a front page article in the local paper. She then chose to give up a career and instead to devote her time to a family. To have seen each of her three sons go to university and succeed in the 'professions' has been a part of the fruit of that decision. Thoughout, my studies she has been an unseen help on virtually every page as she has been prepared to read and honestly critique the work. I will always be in her debt for her ability to challenge poor lines of reasoning and probe weakly expressed sentences. I elected to read for this degree at Keele as it had been her 'alma mater' and this doctoral thesis is a small tribute to her.

This is not to diminish the role of others, particularly, my wife who has been very tolerant in allowing me to use both time and money that could have been used within the family to complete this study. If it had not been for her understanding and patient nature, there is no way I could have completed this work. She has repeatedly allowed me to disappear away into study while keeping our three young children happily entertained.

I am grateful to each of the interviewees who freely gave up their own time to answer my questions and similarly to those who participated in the pilot study. I would record my thanks to

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Chapter 1 – An introduction to technology in school

In 1997, New Labour introduced a national ICT strategy for schools and went on to spend over £3.54 billion on educational technology. This study sets out to make sense of why a group of senior leaders in secondary schools in the same county spend money on Information and Communications Technology (ICT) equipment. After this introductory chapter, I survey the politics that has translated spending money on technology from the periphery to the core of school spending habits. The study then shows the debates around the differing models of pedagogy that the use of ICT offers and see the lack of empirical evidence behind much of the rhetoric. After this extended attempt to signpost my study I then move to a presentation of my own research.

In this introductory chapter I aim to provide the immediate context for the research and why the views of my interviewees should be seen as significant to understanding why money is being spent on ICT. The process of understanding the significance of the interviews begins with grasping the role of senior leaders and the framework in which school decision-making operates.

How schools make decisions

The secondary schools and academies within the study are all funded by the state. All state schools in England have a governing body and in the case of those with another status, such as Academies or Free Schools, then the governing body are also the Trustees. The Department for Education (DFE) Governors' handbook sets the three core duties of governors as: ensuring clarity of vision, ethos and the strategic direction. It holds the head-teacher to account for the

educational performance of the school; and overseeing the financial performance of the school by ensuring its money is well spent. (DFE, 2015:7). The breakdown of the functions and responsibilities of the governing bodies differ dependent on their status which is shown in this table:

	Voluntary-controlled	Voluntary-aided	Community	Foundation		Academy / free school
					Trust	
Admissions authority	No	Yes	No	Yes	Yes	Yes
Employer of staff	No [a]	Yes	No [a]	Yes	Yes	Yes
Owner of land and buildings	No [b]	No [c]	No	Yes (usually) [d]	No [c]	In certain cases
Revenue funding	Local Authority	Local Authority	Local Authority	Local Authority	Local Authority	Secretary of State
Charitable Status	Exempt charity [e]	Exempt charity [e]	No	Exempt charity [e]	No	Exempt charity [e]

Figure 1 - Roles of Governors (DFE, 2015:7)

The DFE handbook suggests that governing bodies should include the head-teacher, several members of staff (both administrative and teaching), several community representatives (often from local political parties), several elected parents and a number of co-opted members (who are recommended by the head-teacher based on the potential usefulness of their professional experience).

The senior leadership team of secondary schools and academies are a small group of individuals comprised of a head-teacher, deputy and assistant head-teachers. The senior leadership team write the school plans and policies; they allocate the finances and report on their work to the governors. Each senior leader is usually responsible for a group of academic or pastoral middle leaders (e.g. Head of Mathematics or Head of Year 7) and these middle leaders are then

responsible for the classroom staff and administrative staff within the organisation. While a head-teacher would refer the decisions made by the leadership team to the governing body and expect senior leaders to appear to brief governors about initiatives, the governors' oversight doesn't extend into controlling their managerial actions. A governing body would approve the financial plan for the school and then senior leaders would have a wide degree of discretion as to how money was spent within those budgetary headings.

The National Governors' Association comment that 'It is important that governors understand where the line lies between their strategic responsibilities and the management responsibilities of the head-teacher and senior leaders. Stepping over that line is inappropriate and can make the head-teacher's job harder.' (NGA, 2015:6). The role of governors is to work with senior leaders to set out the vision and broad ambition of the school (NGA, 2015:6). It is the role of senior leaders to turn vision into reality by creating the necessary development plans. The senior team then work with staff to implement the plans and this is reported back to the governors, to enable them to monitor the vision.

The Political ideologies behind ICT policy making within schools

In the second chapter I explore the history of ICT policy making towards schools more fully. In that chapter it will be noted that since the 2010 General Election there have been significant cuts in public services (although the government claimed to have protected front line services in schools (Paton, 2010)). This study explores the extent to which the interviewees identify with the idea of 'reduced finances' and their attitude towards ICT and pedagogy, which then helps to explain their practice when they are given greater freedom over the way to spend money.

Politics shapes the way in which our education system is funded and decision-making in this area cannot be understood without reference to this wider context. Both the teaching of ICT and computing in the curriculum is under 40 years old. Purchasing technology is not just a practical decision, as there are distinct ideologies which seek to use ICT to realise their own ends and I will show in the third chapter that that they are arguing over a differing educational future.

A driver for the contemporary use of ICT has come from the neo-liberalism (Heslop, 2007; Kozma, 2005) which has dominated British politics over the last twenty years (Jones, 2003). Neo liberalism has relied on the individualist economics philosophy of the Austrian school (Hayek, 2005; Hayek, 2009; Rothbard, 2004; von Mises, 1940) who believe in minimising a collectivist approach and think the best decision maker for planned economic action are citizens themselves. The neo-liberal approach seeks to minimise the importance of the nation state and promote choice and competition. Andrew Glyn (2007) refers to neo-liberalism as 'capitalism unleashed'. Neo-liberal policy makers have used the language of consumerism and globalisation in their promotion of ICT. It is valued for its ability to create wealth and allow for individual expression. Apple (2001:11) coming from the political left, identifies the commitment of neo-liberals to 'individual choice' and neo-conservatives to discipline and forms of traditional knowledge and teaching. Over recent years, the increase in the professional middle class has strengthened the calls for education to be transparent for parents, empowering, efficient and full of choice (Buckingham, 2007) – all of which are acting as drivers for more ICT in schools. These ideas are explored more in the second chapter.

An ideology that shares an emphasis on the individual with neo-liberalism is libertarianism. This thinking is strong in the United States with its heroic vision of the cowboy as the master of his own destiny and the arch-type of the rugged individual (Lipset, 1991; Rothbard, 2004). Libertarians emphasise personal responsibility and individual self-sufficiency and there is a strong vein of this ideology in aspects of some visions for ICT. Selwyn (2014:26) observes that libertarianism and individualism have embodied themselves into a vision for digital technology. He sees libertarianism trumpeting the empowerment of the individual in the teaching of coding and identifies its influence in a vision of movies, music and films being produced by empowered fans. The data that I present will show the extent to which the Coalition government influenced the thinking within my sample towards the teaching of programming and coding and to separate it out from the teaching of ICT.

In distinction to the above ideologies is the hippie counterculture of 1960s California with a set of progressive and counter-cultural ideals. Steve Jobs, founder of Apple, was not alone as a major player within the industry in drawing his inspiration from this type of thought (Hiltzik, 1999). The hippie philosophy sought to reorganise society and education with greater openness and collaboration. They had a vision of a reconstructed society being supported by a virtual world that transcended national governments and gave individual citizens the tools to stand against big companies and governments. Jobs saw technology as a stand against the authoritarianism and a means of promoting individualised growth. Selwyn (2014) shows how ICT was seen as a means of 'deschooling' and allowing greater independence, radicalism and the sharing of knowledge. In the second chapter, I show how these competing ideologies have influenced the political and policy sphere.

Technology and pedagogy

In the third chapter I note that there is a broader academic debate as to why schools should choose to spend money on ICT (Cuban 2001; Facer 2011; Fullan 2013; NESTA 2012). There are those from the 'Edutopian' school (Chen and Armstrong, 2002; Fullan, 2013) who see it as transformational, innovative and an essential part of preparing children for modern life, while others adopt a more cautious 'Dystopian' narrative, such as, Cuban (2001), Selwyn (1999, 2002, 2004, 2008, 2011, 2014) and Facer (2011). It should be noted that whilst the 'Edutopian' label would be recognised by those holding that position, those holding to a more sceptical stance would not recognise 'Dystopian' as a label: it is one that I have coined to create the contrast with the 'Utopian' position that they are controverting. The sceptical academics would argue that there is little empirical evidence of real impact behind this spending. In the third chapter, I examine the academic debates around the use of technology, as ideology affects the pedagogy. The response to the different ideologies can be driven by political views, or equally they could be led by your personal perspective on the nature of learning.

If you take the view that learning is a social process you would naturally oppose models of pedagogy that seek to replace the teacher with a computer or that significantly increase class ratios. If you favour individualism and believe in the importance of freedom of choice then this will lead you towards computer based training solutions. The promotion of large e-learning projects draw on an ideology that minimises the place of the state and aims to cut the cost of governance. Buckingham (2007) comments that you could see Virtual learning environments

(VLEs) as minimising the social side of learning because they support learning taking place individually. In the VLE model, learning is linked to a student accessing videos, animations, handouts, etc., without the need for direct social interaction. Similarly, VLEs have a political 'consumerism' undertone as the modern versions are often integrated with school data systems and are then used as the vehicle to communicate progress and behaviour reports directly to parents. The use of digital technology to share data draws on an ideology of education as a commodity. Increased use of data analysis enables managers to monitor and assess teacher performance. Apple (1990, 2001), Selwyn (2014), Noble (2002) would argue this is a backward step that atomises the complexity of teaching and deskills those involved. The choices being made in this area are not value free. In the third chapter, I explore the arguments from both Edutopians and Dystopians and this provides a useful context to exploring the views of my interviewees.

My research question

The aim of this study is to ascertain whether a contraction in public sector finances has altered the view of the role of ICT within education for the group of schools and academies I have studied. To explore this aim, I have focused on three key questions: firstly, who makes the ICT spending decisions; secondly, what processes and priorities are used within that decision making; and thirdly, what wider political issues affect those decisions.

I began the research with the intention of looking at budgets with a set of large scale quantitative data, but over the study my view of the important areas changed. The research questions were the product of several influences: the theoretical background had identified a range of topics that

I thought may be worth of developing; a pilot study then guided me towards which questions elicited the more interesting responses, and most of these focussed on the people and motivations behind the spending rather than the detail of what was bought; after completing the final data gathering with my sample I could then sit down and try to create themes around the responses. Following the pilot, I had five areas that I felt needed to be developed into research questions but after reflection these were reduced to the three listed above, as I had moved away from issues around financial analysis of spending patterns and institutional structures, both of which would have merited a study in themselves and an entirely separate theoretical background and approach.

A significant advantage that I enjoy as a deputy head-teacher in the same county as the schools in the study has been research access to the key decision maker for ICT. The methodological and ethical considerations are addressed more fully in the fourth chapter, at this introductory stage I would argue that this study presents an insight into the opinions of people who actually make the managerial spending decisions on school equipment and looks at what they are doing and why they do it. The interviewees are making these decisions on how to spend the schools' money in a political culture where school budgets are under financial restraint. My research questions will explore how they feel that the choices they are making have impacted on their schools. It was my purpose to investigate their understanding of why they make the decisions that they do; whether they are sustainable, what motivates their thinking and is it changing in the face of fiscal restraint?

On the first question, 'Who makes ICT spending decisions?' I argue that there are three main alternatives: firstly that the decisions are being driven centrally by government; or secondly, the

majority of decision making could be seen as reactive, with schools simply adapting policy; thirdly, decisions may be entirely localised with schools being responsible for driving change and decisions being taken at a level that is not responsive to, or not affected by, the views from central government.

The second question looks at the processes and priorities that inform decisions and I will examine how the interviewees express these views in the language coming from the Edutopian and Dystopian positions. A reduction in the budget and greater degree of local control does not necessarily create a change in approach towards ICT. BECTA (2006) encouraged school leaders to look at the total costs of ownership (TCO). It commented that the total costs per PC varied greatly from school to school sometimes accounting for 25% of the total budget. The British Educational Suppliers Association (BESA) research (Hobson, 2010) indicates that UK schools, in the face of reduced budgets, intended to maintain ICT spending and budgets throughout 2011. However, Bailey (2010) comments that budget restraint was a top concern for 84% of schools in 2010 and goes on to cite a movement amongst schools to outsource ICT. The BECTA (2007) review noted that the secondary school average of pupils to machine was 6.2 and that over 95% of secondary schools provided laptops to some students for use in learning with the consequent issues in replacing ageing laptops. My research seeks to show whether the interviewees have retained their commitment to ICT spending, given the change in finances. Equally, the priorities towards ICT are not necessarily visible in just financial terms. Crook (2010) examined the successful uptake of ICT and identified the significance of each of the following factors: leadership, a learning platform, staff development, and versatile learning spaces. Jones (2004) indicated that process and procedures around the use of ICT are significant and that failings in these areas can be as

significant as availability of equipment (see also Mumtaz (2000); Ross et al (1999); Cox et al (1999); and Guha (2000)). From an evidence based policy perspective, BECTA (2007) and Bradley and Russell (1997), support academics, like Cuban (1999), in identifying technical support as a key area which affects the view of the role of ICT in schools.

The third question looks at 'what are the wider political factors affecting decisions?' I will seek to explore the effect of a change in political direction. In the 2005 report on 'Harnessing Technology', Ruth Kelly said about the government's goals for boosting performance and standards across education that, 'in achieving these goals the effective use of interactive technologies is absolutely crucial and I am determined that we grasp them.' (DFES, 2005:2). The Labour government had placed ICT in the centre of its education strategy rather than viewing it as an accessory to be used. New Labour led a centralised policy supporting the use of ICT in schools and guided this with policy based research from bodies, like BECTA and the TTA. Selwyn (2011) says the Coalition have abandoned this vision for digital technology out of an ideological position to re-orientate state involvement. He says, that the Coalition's ambition is to withdraw the state from the governance and procurement of schools technology (2011:400). The role of the school leader and the nature of the processes being followed, now have greater importance. It is important to understand how school leaders reach out into their communities and establish links. When leaders are faced with greater control and reduced finances, how do they learn from one another, to provide technology that is suitable and sustainable? The choices that they make and the vision they have for ICT will have a significant effect on what happens within the classroom. In the light of academic debate between the Edutopians and Dystopians, I wish to identify their

rationale for spending money on ICT, the choices that are being made and the extent to which these narratives have embedded themselves into thinking.

The British Educational Communications and Technology Agency (BECTA)

As will be seen in both the findings and associated literature, the interviewees refer to the influence under New Labour of a now defunct QUANGO, called BECTA (British Educational Communications and Technology Agency). In the third chapter on pedagogy, I devote a section to this agency, because of the way it is referenced in the interviews. It was a government funded QUANGO (quasi-autonomous non-governmental organisation) that began in 1998 under New Labour and was designed to promote 'school improvement by the use of technology' (in a similar way to the JISC in higher education) and provide research for 'evidence-based policy'. BECTA's approach to school improvement and policy involved commissioning a range of organisations and academics to write studies into school practice. This work differs from the academic debates, as it came from a QUANGO, yet the evidence based policy research should not be ignored. BECTA reports were read by school leaders and had an influence on the approach followed by OFSTED. All schools are graded on a regular cycle by OFSTED and no senior leader could afford to ignore those who influenced the views of inspectors. BECTA was abolished by the Coalition in 2011.

Where do I fit into the research?

My background is that of a senior leader within a secondary school who has made decisions over spending money on ICT in this and my previous three schools. I am aware from personal

experience of the challenge to demonstrate effective spending faced by the need to reduce costs. There is a danger in assuming that my knowledge and experience gained from my positions is shared by others. Equally, there is a danger of interpreting the views expressed by others based on my own experiences.

Another danger for my research could be the impact of revealing views expressed in a more candid fashion than they might have been to a researcher that was unknown. I exercised a degree of judgement in ignoring some candid expressions that could damage either those interviewed or their school, whilst still retaining the essence of what was being said. I believe I enjoyed the 'trust' of those I interviewed and feel a moral obligation towards them. Despite my efforts, presenting their views may allow others to conjecture about the schools involved, but this risk is minimal as I have not interviewed all those in the county and have anonymised their views removing specific factual references that would make the interviewees more readily identifiable. All the research has been conducted to comply with the rules and guidance of the Keele University Ethical Review Panel and in the fourth chapter I explain further about my approach.

How the study is structured

My purpose in this chapter has been to establish the role of the senior leader and introduce the aim of the study and three research questions. In Chapter 2 I explore in more detail the wider politics affecting ICT in schools. Chapter 3 details the academic debate between those of the Edutopian perspective and those who are more distrusting of the place being given to educational technology (which in the absence of an identifiable label I have called Dystopians). Chapter 4

provides an overview of the methodologies employed in the study and related procedural issues. The remaining chapters present my findings regarding the views of the senior leaders and develop their ideas on the role of ICT within education in the climate of 'reduced finances'. The findings chapters have been structured around the research questions on who are making the key decisions, what processes and priorities they are applying and how they have been affected by their wider context. The last chapter summarises the findings and gives conclusions with recommendations for other areas of study.

Chapter 2 - Technology within school and politics

Chapter 2 explores in more detail the wider politics affecting ICT in schools. I begin by considering how the post-war governments have developed their policy-making around spending on technology. An aspect of the research that is explored in the next two chapters is how governments and schools have been led to commit to significant levels of spending out of a belief in ICT's importance to national economic growth and international competitiveness. Technology moved from the periphery of the policy making agenda in the 1970s, to becoming a series of projects in the 1980s, then to being the object of millions of pounds in ring fenced funds under New Labour before changing to a matter of choice with the Coalition. The section on the Coalition, at the end of this chapter, defines my use of the term 'reduced finances' as it is applied throughout the study. In the third chapter, I detail the parallels in the academic debate around technology and the influence of certain narratives around economics and globalisation.

A change in priorities

From an early stimulus under the Conservative governments of the 1980s there was a range of initiatives to increase the use of computers within schools. The Labour government of the late 1990s introduced the first ICT national strategy and two decades later a Coalition government changed this emphasis. In the post-war period significant sums of public money have been spent with a wide range of outcomes.

Yang (2012) cites Harold Benjamin's essay that imagines the changes within a hunter gatherer society as a result of climate change. Benjamin conjures images of the change required of their education system as their knowledge and skill requirements altered. Yang adds, 'This motive is echoed in the current expectation of educational transformation with information technology.' (2012:101)

The broad consensus, that globalisation has created a set of economic and political conditions requiring education to focus on a global knowledge economy, is open to challenge. As I further develop in Chapter 3, there is a skepticism from Selwyn (2014) and some other academics towards an orthodoxy that has spread across much educational and policy research regarding the inevitability of digital technology. On the one hand Facer says, 'the risks are that schools will be preparing students for a future of radical inequality that offers desirable futures for only a small elite and sustainable futures for no-one' (2011:88). On the other hand, Senge embodies this consensus, when he argues that it is no longer possible in today's world, which is full of globalised businesses and globalised news, to think in a purely national or local fashion (Senge, 2003).

The argument rises above the nation state and appeals to international conditions in setting the framework for determining policy in the economic sphere. The OECD, in 2001, proposed a series of schooling scenarios for the 21st century that ranged from continuing with the current bureaucratic models to a complete breakdown of our existing system into a de-institutionalised approach that uses powerful and inexpensive ICT to create a 'network society' (Istance, 2003). In the third chapter I draw on the work of various thinkers (Stiglitz (2002), Kozma (2005)) who seek to establish the significant impact of digital technology upon the global economy and the way we do business.

Stiglitz says,

> 'Knowledge and Information is being produced today like cars and steel were produced a hundred years ago. Those, like Bill Gates, who know how to produce knowledge and information better than others reap the rewards, just as those who knew how to produce cars and steel a hundred years ago became the magnates of that era.' (Stiglitz, 1999:1)

His argument shifts macro-economic priorities, as in this type of 'knowledge economy' growth depends on access to information rather than methods of production. While he does not have a prescriptive idea for this cultural change (1999:4) he does see a role for governments in education, by encouraging entrepreneurship and creating a rewarding regulatory and tax framework. Kozma uses these arguments and seeks to draw support for them from the growth of the South-east Asian countries as they have promoted education and the production of knowledge and technology. Free market economists would differ and not accord to 'government' the ability to create successfully this type of macro-economic change. This view is supported when Erumban & de Jong note the differences in the way new technology stimulates economic growth, saying, 'some countries are receptive to changes, others are not. Hence, some countries lag behind while others lead.'(2005:2).

Yang (2012) comments on the way that recent UK governments have sought to stimulate this movement towards valuing methods of access to knowledge by promoting technology in their education policy. They have encouraged the use of technology in schools with a twin approach of developing our national communications infrastructure and supporting educational hardware,

software, and training. Brown and Selwyn comment in relation to the convergence of policy towards extending education and establishing information infrastructures that,

> 'The last decade has seen many developed countries initiate multi-million dollar programmes aiming to connect education systems to the Internet and other communication networks; thereby boosting the use of Information Technology (IT) in both compulsory and post-compulsory education.' (2007:155)

The approach has been central to the thinking of recent UK governments, who have given a major boost to ICT in schools. 'The New Labour government of 1997 launched the UK's first national ICT strategy, with the flagship initiatives of the National Grid for Learning (NGfL) and the New Opportunities Fund (NOF), and invested £3.54billion in ICT in schools' (Younie, 2006:386). The ring-fenced funding from the New Labour government promoted a significant increase in school spending. ICT had gone from the periphery of our policy making to its centre within twenty years. This policy direction may have been accepted, but there is a lack of empirical evidence for its practical benefits. There remains a worrying lack of quantifiable evidence to justify the expenditure on hardware and infrastructure for ICT. Livingstone (2012) notes there is a distinct absence of quantifiable studies that show the impact of ICT on examination results or other standardized measurements of attainment.

> Yet, despite considerable evidence that teachers, along with parents, pupils and other stakeholders *believe* ICT to improve outcomes, too few independent evaluations comparing educational settings with versus without an ICT intervention have been conducted, and those that exist are rather equivocal in their conclusions.' (Livingstone, 2012:3)

It is little wonder that Facer and others question a narrative that solely sees 'technology' as the cause of societal change. In her view, a highly partial account of technology can easily overlook the more significant ways in which our sense of self, community and society have moved over the past 30 years. Facer, Selwyn, Cuban and others challenge a discourse that overlooks the dynamism of educators and educational activists in bringing positive change to society. Facer says,

> 'The argument that the last century has seen few changes in schools, after all, relies on a particularly partial view of what counts as change. It requires in Western countries, for example, that we overlook the fact that women and people of colour are now assumed to have the same educational rights as men and white people, that those with learning difficulties and physical disabilities are accorded respect and education rather than being consigned to asylums..' (2011:3)

How did the spending priorities in our educational system shift towards knowledge and technology? By understanding, what drove this shift in spending and the wider politics behind the

decisions, we are more likely to be able to address the central question as to whether a contraction in public sector finances will alter the view of the role of ICT within education.

Post War – Building a better tomorrow

Between 1951 and 1975 spending on education at a national level increased at an unequalled rate rising from 6.5 to 12.5% of public expenditure (Lowe, 1993; Simon, 1991). Jones comments,

> 'In the process, despite the scepticism of some on the right, education became from the mid-1950s onwards a policy area of relative consensus, where those concerned with economic growth and those committed to increasing levels of educational opportunity could find themselves in agreement.' (2003:39)

In the post World War II era, Britain had an expanding economy that was moving away from dependence on mining, manufacturing and agriculture into professional and service industries. The country saw an expansion in the labour force due to inward immigration which filled some of the gaps left in production industry (Jones, 2003). In a world where the country needed more labourers to compete with other nation states for scientific and technical jobs that were drawing international capital we witnessed more and more children proceeding to higher levels of education (Crowther, 1959, recommending the raising of the school leaving age) and the expansion of higher education (e.g. Keele). Education brought upward social mobility, but it was significantly divisive with 73per cent of students leaving with no qualification and at the same time 'graduate output' was rising for each social group (Jones, 2003). Despite the Crowther report talking about 'Education as a vital part of the national capital investment' the government had

little control over what was actually happening within the classroom. Jones comments,

> 'The development of detailed and practical solutions to the problems of schooling had thus to be worked out at a non-governmental level, where not policy-makers but teachers had greater influence.' (2003:52)

This was a time that pre-dated the widespread use of ICT. However, the social trends towards the service industries and social mobility set the groundwork for the focus on a 'knowledge economy'.

1970s – A decade of social change

In the mid-1970s the economies of the world fell into a recession and this exacerbated the decline of heavy industry in the UK (Jones, 2003). In October 1976, speaking at Ruskin College, Prime Minister Callaghan outlined a change in our educational direction.

> 'Decentralisation of educational control was a problem, not a solution. Education policy should be guided by economic imperatives; students should be prepared for the 'world of work'; existing classroom practice should be subject to critical scrutiny, central influence over educational change should be asserted.' (Jones, 2003:73)

The politicians were beginning to combine their educational and economic rhetoric while at the same time teaching militancy was on the rise with the first national strike in 1970 (Jones, 2003). It brought demands for change around race, gender and social class. In the midst of this radicalism

and teacher militancy, a rather minor project called the National Development Programme in Computer Assisted Learning was announced that ran for five years with a budget of £2million. Its initial focus was directed toward the post-16 sphere and then was complemented by 'The Computers in the Curriculum' project, running under the schools' council at a pre-16 level. Yet, the middle of a recession was not a time for schools to spend money on an unproven idea. Limited technology spending was confined to specific projects in five subject areas. In those early days the type of computing that was done in most schools consisted of a heavy diet of programming based on a simple drill and lots of practice. Buckingham sums it up, 'The drive to insert computers in UK schools dates back to the mid-1970s although it began to appear more prominently on the political agenda during the 1980s' (2011:12). We were not really at the point where the politics that linked education and the economic objectives of government, included a vision for technology.

1980s – A Thatcherite revolution

In 1979 the Conservatives came to power led by Margaret Thatcher who was determined to implement a radical programme of change. Its neo-liberal agenda promoted de-regulation and the collapse of non-profitable industries which in turn would bring about real social and economic restructuring.

Almost immediately the focus on improving school effectiveness started and witnessed the launch of the Microelectronics in Education Programme (MEP) with a budget of around £12.4 million (Twinning, 2002). This was followed up by the Technical and Vocational Education Initiative (TVEI)

and the Department of Trade and Industry (DTI) Micros in Schools scheme. Undergirded by its belief in privatisation the DTI proposed offering 50% funding for the purchase of the first computer in a school. The first set of initiatives were widespread and by the first report in 1983 it was estimated that £30 million had already been spent. The political encouragement for spending on ICT was illustrative of a government that was seeking to highlight the failures of previous administrations to prepare for the future. Technology was being linked to a politics of social restructuring and had found a place in the broad vision around knowledge, education and economic prosperity. By 1985, HMI had included 'technology' as a ninth curriculum area in the list of what constituted a rounded education (Layton, 1995:90).

There remained significant hurdles for the use of technology, many due to the absence of a proper infrastructure. Throughout the 1980s and into the 1990s the internet was not available as a public resource and the typical use of computing centred on basic office applications and developing CD-ROM computer based training packages that would include multimedia. A typical multimedia educational package of the early 1990s was the encyclopaedia, Microsoft Encarta. Technology appealed to those who believed in breaking away from a teacher centric traditional model as it offered new opportunities to teach using movies, animation and audio.

In terms of ICT suppliers, two companies that had a significant market share were: *Research Machines* (RM) who offered a customised educational PC type package; and *Acorn* who also offered a customised solution for schools but not on a PC platform. Buckingham (2007:15) explains the rise of this technology spending by giving educational credibility to the government desire for international competitiveness and to a corporate desire for creating a domestic market for PCs. He shows how this idea of creating a market had been used in the USA with televisions

and when adapted to the UK was supplemented with the concept of the educational benefits of programming (2001:21).

During the 1980s and into the early 1990s, there was no requirement to incorporate ICT across other subjects in the curriculum and its uptake fell to the professionalism and aptitude of individual teachers. However, the political will and initiative to encourage technology as a solution within schools had begun and would soon gather pace.

Selwyn (2002) regards the 1980s as a critical period in shaping the development of technology and the use of computers in education. He sees the government, the equipment manufacturers and the media all pursuing the idea of the 'educational computer' with each having their own interest in the development of the idea.

> 'educational computing was clearly configured by a host of actors' intent on pursuing primarily non-educational goals behind apparently educational aims. Thus, the notion of the computer as a powerful home tutor or tool to modernise schools gradually became an accepted part of the 'information revolution' discourse during the 1980s regardless of government or industry's prime motivations' (2002:439).

1990s – Majoring on Blair

The New Labour government of the late 1990s and 2000s held various neo-liberal ideas, indeed Tony Blair was often heralded as the true successor to Margaret Thatcher. His politics were part of a wider attempt to synthesise the right and left wing of politics by centre left progressive politicians. Both Tony Blair and Bill Clinton came from the left wing and advocated a form of neo-liberal and socially progressive politics that were different from the traditional party position.

Cuban (2001) shows how governments on both sides of the Atlantic had joined with the technology industry in creating a narrative around ICT bringing greater efficiency and more engaging lessons. This was reflected in aspects of UK educational policy making, including spending on technology. Buckingham says, 'interest in educational technology among policy makers has significantly gathered pace since the election of the first New Labour government in 1997' (2007:15). Blair asserted 'Technology has revolutionised the way we work and is now set to transform education. Children cannot be effective in tomorrow's world if they are trained in yesterday's skills' (Buckingham, 2007:15). Cuban (2001:71) shows from studies on both sides of the Atlantic that when teachers integrate technology into their lessons it is usually to maintain their existing practice. Nevertheless, Labour had adopted the narrative of globalisation and 'knowledge economy'. Reports in the 1990s (McKinsey, 1997 and Stevenson, 1997) concluded that the state of ICT in secondary schools was 'primitive' and that it should be a public priority to increase its use by the development of a coordinated national strategy (Younie, 2006).

In practice, this meant government support for organisations like BECTA who would then fund research and inform government planning. BECTA research would support the political and

education policymaking and then the effects would be reported by OFSTED. Tony Blair saw this blend of technology, innovation and inclusive education as the key to the UK's success (Jones, 2003:154).

A complementary focus to curriculum development was found in the central control over the publication of performance indicators, standards and league tables. The demand for data necessitated better internal technological infrastructures to deliver this level of detailed performance information. The desire for data stemmed from a perception that under the Conservatives, teachers had been lightly managed and allowed to create a culture of inertia with low expectations of many pupils. Angus (2004) observes similarities in how globalisation in economic terms had affected educational planning in Australia, and demonstrates how concepts of managerialism and market arrangements brought with them a shift towards centralisation, the greater use of technology and an orientation towards performance rather than social justice. Technology had become a key part of the national social, economic and political vision (cf. Buckingham, 2006:6).

In 1997 the New Labour government launched the UK's first national ICT strategy with the dual spearheads of NGfL and NOF and had spent £1.6bn by 2002 (DFEE, 1999), rising to a final total of about £3.54 billion (Younie, 2006). The introduction of these policies focused on four areas: the problem of ICT resourcing, the need for teacher training, the need for school leaders to develop whole school policies and the need for curriculum demands for ICT. Despite the best efforts of BECTA to guide schools in spending these substantial sums, in 2001, DFES would comment

> ‘the massive resources pumped into infrastructure and teacher development have yet to bring about a transformation of teaching and learning’. (2001,18)

On teacher training the Labour government oversaw a programme of training funded by the National Lottery called the National Opportunities Fund (NOF). The government worked with the private sector to create a certified a range of NOF providers. The programme was rolled out across all schools with each having to pick a provider from an approved list. OFSTED (2001) would comment that the quality of this training was often inconsistent among suppliers and that schools found it difficult to access information about the range of training programmes available. OFSTED (2001) reported on the use of ICT within subjects and showed that in practice it was still very patchy. The inspectorate (OFSTED, 2001) felt NOF training often increased teachers’ confidence with ICT but neglected the link to teaching and learning. In their view a determinant of the success of NOF training was its clear endorsement by the head teacher.

Infrastructure and educational software were another focus. The late 1990s saw the rise of the World Wide Web and in this period, before the dot-com crash, many schools spent significant sums of ring fenced money on Internet based training packages. At the start, internet training consisted of text and small pictures (which hardly competed with CD based multimedia alternatives) but soon the money flowing into the sector was creating internet based e-learning packages. Buckingham (2007) notes how the *National Grid for Learning: Open for Learning, Open for Business* use the narrative of globalisation for adoption of the web. Selwyn shows the contradictory messages coming from policy and industry documentation,

> ‘The Grid is portrayed both as a complete reassessment of educational practice, but on the other hand, a mere tool for teachers and students to use like any other. This tool is easy to use but also unfathomable without expert advice. It is mundane and every day, yet exotic and exciting; steeped in the confines of history and futuristically limitless.’ (1999:62)

The centralised funding meant that the prices of software inflated quite quickly during the period. Yet, the government were keen to ‘transform’ the use of educational technology and to fund an industry that it saw as being able to raise standards (Buckingham, 2007).

2000s – The legacy of the Blair years

Before the rise of BECTA and New Labour, Selwyn (2008) saw the planning for ICT in schools as being predominately piecemeal. They had sought centrally to plan the curriculum with a ‘model’ for good teaching which was encouraged through the inspection framework. School leadership teams were expected to challenge specified groupings who were showing under attainment, often using software to provide a bespoke educational experience. Technology was needed to improve the lessons and monitor the results.

> ‘In 2008/9, UK schools spent some £880 million (or 3.2% of overall spend) on ICT, nearly one third of this from the ‘Harnessing Technology Grant’ from government (BECTA, 2009a). Digital resources of one kind or another are used by almost half of all primary pupils at least weekly (43% in English, 46% in maths and 30% in science) though less than one in ten secondary pupils (8% English, 7% maths and 10% science; BECTA, 2009b). So, with government policies to provide internet access for every child and every school, with industry supporting diverse digital education initiatives, and with families gaining internet access at home, much rides on the claim that digital technologies will be as important in the twenty-first century as was the book in the nineteenth.’ (Livingstone, 2012: 10)

Buckingham (2007:19) cites Charles Clarke, in 2003, asserting that technology was having a huge impact on performance, motivation and self-esteem. New Labour maintained the vision for technology at the core of curriculum change throughout its years of office, despite the absence of an evidence base for the grand claims being made for it. Selwyn notes that despite the potential for ICT to be a short-term policy ‘fad’ it was actually a part of a sustained policy agenda for the ten years following the 1997 election (Selwyn, 2008:703). Policy makers introduced a range of initiatives, such as *e-learning credits* (eLCs), to drive the development of software resources and *Harnessing Technology* to support the adoption of virtual learning environments. In the 2005 report on ‘*Harnessing Technology*’, Ruth Kelly commented on the government’s targets for

boosting performance and standards,

> ‘In achieving these goals the effective use of interactive technologies is absolutely crucial and I am determined that we grasp them.’ (DFES, 2005:2)

The focus on networks that linked schools back to the DFES created a system that could be increasingly driven from the centre. The administration side of schools became ICT dependent in a range of areas: its ability to timetable all the possible teaching combinations with a more mobile labour force; a constant need to deliver examination results’ analyses at multiple points in the academic year; a need to track and monitor student performance at all key stages; and the ability to gather data on a whole range of indices that affect performance. At the same time, in line with the neo-liberal emphasis on individual choice, all schools had to open their ICT data infrastructure to parents and communicate real time data on students’ performance, discipline, personal details and attendance.

The focus on improvement through measurement was not problem free. The government faced with a correlation between the schools in the socially advantaged areas achieving more than the schools in less advantaged areas created models to show ‘value added’, such as, Contextual Value Added (CVA) and Jesson. The data was critiqued by statisticians (Gorard, 2009) but they still formed a basis of school inspection.

A problem in measuring standards was that the evidence showed ‘no consistent relationship’ between the use of ICT and the improvement in results (Buckingham, 2007:20). The technology was not delivering the necessary advances in results and, therefore, it needed to be ‘embedded’ into practice. Schools avoided an unfavourable CVA by encouraging groups of students to sit

additional qualifications, such as OCR ICT (which could give four good GCSEs), COPE (Certificate of Personal Effectiveness) and an ALAN qualification (Adult Literacy and Numeracy – which gave them the necessary C grades in English and Maths). This was often done under the umbrella of 'personalisation' and allowing children to achieve in the way that most suited their future (Buckingham, 2007; Selwyn, 2008).

Selwyn (2008) adds that the technological revolution in UK schools had failed to materialise, 'Indeed many of the educational and technological issues that the New Labour ICT agenda purported to address can be said to remain as problematic in 2008 as they were in 1997' (2008:705). When BECTA identified faults in its research, the policy guidance was usually more ICT and greater centralisation. The technological vision of a standardised centralised curriculum that would avoid the need for every school individually re-inventing the wheel was challenging. Despite a decade of greater centralisation, school technology infrastructures remained filled with idiosyncrasies and were managed and run by people who were protective of them.

The desired transformation remained elusive as the discourse morphed from a 'knowledge economy' towards learning and personalisation. Learners would become customers who co-designed their experience, and technology could allow for 'learner-focussed feedback' with different types of qualifications enabling the consumer to move from school to school. Buckingham (2007:23) notes the difficulty faced by many in taking advantage of these personalised opportunities.

Throughout the 2000s, the e-learning industry continued to sell a concept of personalised electronic courses delivered across large groups of students. It linked to Hargreaves' ideas of small

leadership teams supported by a variety of 'deskilled' teachers who assist students in co-creating and personalising learning. 'The curriculum and new technologies gateways are critical to personalisation because they offer potential ways in which the experience of school might become more engaging for students.' (Hargreaves, 2006:8). It was a vision that allowed more children to learn simultaneously at their own pace with behaviour controlled by the lower paid 'teaching assistants' or 'cover supervisors'.

Overall, Selwyn saw the outcome of New Labour and all the work of BECTA as being double edged. It improved the finance and the quantity of computers in classrooms but it moved the educational vision away from a learning and discovery towards the centralisation of delivery and testing. 'Thus the legacy of the New Labour ICT agenda can be seen as heightening the profile but also limiting the scope of 'ICT' in educational settings' (Selwyn, 2008:709).

2010s – Coalition and a reduction in public finances

In 2010, David Cameron succeeded the New Labour government by forming a Coalition government from the Conservative and Liberal Democrat parties. It began with a package to 'reduce public finances' that drew on the popular perception that the New Labour government had been spending above its means. Hood refers to the period after the 2008 financial crash as 'hard times'. He says, 'Taking the 2008 PBR and the 2009 Budget forecasts together shows that the financial crisis is estimated by the Treasury to have permanently weakened the public finances by about 6½ per cent of national income, or £90 billion a year. '(Hood, 2009:3) The Coalition agreement, which was the basis for the two parties working together, stated in Item 9

(deficit reduction) that they would take 'immediate action to tackle the deficit in a fair and responsible way, ensuring that taxpayers' money is spent responsibly, and get the public finances back on track'(Coalition, 2010:15). It added, 'we will significantly accelerate the reduction of the structural deficit over the course of a Parliament, with the main burden of deficit reduction borne by reduced spending rather than increased taxes.' (Coalition 2010:15)

> 'Rather than basking in a post-election "honeymoon" period, the first 12 months of the Coalition administration saw a sustained agenda of policy reforms and policy reversals across all government departments. While these actions centred on a number of aims, they were underpinned by the perceived need for substantial reductions in government expenditure.'(Selwyn, 2011:395)

The 2010 comprehensive review saw education protected from the main thrust of the cuts as it was only asked to make savings of one per cent. The majority of change came as the Coalition swept away a wide range of QUANGOs. Under New Labour QUANGOs had been used to inform policy making. In the field of educational technology there was the loss of BECTA, the SSAT (Specialist School and Academies Trust) and in the wider sphere a range of other agencies, such as, Connexions (Careers), GTC (General Teaching Council), QCDA (oversight of the curriculum) and TPIAG (Teen Pregnancy). 'While a significant reduction in BECTA's funding had been expected under any incoming government, the total disbandment of the agency came as a surprise to many commentators' (Selwyn, 2011:399). The Coalition had not prioritised the need for centrally run evidence based policy guidance to support ICT in school; after all David Cameron had said in 2005 that 'The Tory Party is not an internet party'.

While the overall school budget remained broadly static, an altered funding formula brought differences to the income of many schools. The formula meant that a single sum was devolved to schools instead of a myriad of smaller ring-fenced pots. The impact differed across schools and urban schools were affected differently to rural schools. The government wanted to move away from centralised funding and facilitate local decision making. In the remainder of this thesis I will refer to the approach as operating in a climate of 'reduced finances'.

The spending review made it clear that the government would promote decentralisation. Coalition policy would provide schools with 'greater freedom over the curriculum' (Coalition, 2010:29). It pledged to share responsibility by 'localising power and funding, including removing ring-fencing around resources to local authorities' and 'cutting burdens and regulations on front line staff, including policing, education and procurement' (Treasury, 2010:8). Brundrett (2011:2) describes the 2011 curriculum review as potentially bringing 'a reduction in the bureaucracy under which all schools struggle'. Selwyn says, 'the changes made to educational technology are perhaps best understood in light of the Coalition's "small state" approach to public sector arrangements where central government involvement is minimised in favour of local decision-making' (2011:401).

The cuts in funding to local authorities and the active encouragement of schools to convert to self-governing academies meant that many of the curriculum support vehicles that had existed at a county level were removed. Under New Labour the education authority had often been the broadband provider (with a mixed degree of competitiveness). They had usually supported the development of VLEs (the county preferred provider was UniServity). In addition they provided curriculum support with a county advisor (who was well respected within the county) and they had supported forums for discussion between subject leaders (in the county there was an annual

conference for the sharing of best practice between network managers). Under the Coalition all of this centralised support was largely removed. While I had intended to exclude the self-governing academies from this research, within twelve months this became untenable as nearly every secondary school in the county was in the process, or had been consulting about, becoming a converter academy. Many of these schools converted to academies because of the supposed increase in funding and the greater degree of autonomy from central control.

The Coalition government retained OFSTED and simply rewrote the framework around what made 'good' teaching – refocussing on a didactic style that valued results. The government, in line with the neo-liberal emphasis on freedom of choice, encouraged schools to become autonomous academies that were governed at a local level. The Coalition did not abandon the idea of untrained teachers that was found in the older e-learning ideas. It suggested that academies should employ unqualified staff in the same manner as private schools.

The idea of freedom of choice and links to employment was further promoted with schools being given financial support to establish 'studio' schools. Parents in areas where the school system didn't cater for their needs were advised to establish 'free' schools. During the Coalition the growth of both types of school was significant, many of which specialised in areas of technology. These are mini-schools with a self-governing structure that provide focused training for particular jobs that are seen to be important to the local or national economy, for example, the establishment of a 'Computer Games' studio school in central Liverpool. The studio schools and free schools can be started by anyone (usually parents, businesses or schools) and while they attract central government funding, they are focussed on preparing children for employment and breaking out of the traditional patterns of delivery. This model has been popularised in countries

such as America, in response to a perceived need to improve our international competitiveness and the failings of our state/public school system when compared to other countries (see the film *Waiting for Superman* (Guggenheim, 2010)).

The Coalition distanced themselves from a range of educational qualifications and sought to promote a curriculum that was 'balanced'. In a contemporary commentary on the proposals, Brundrett (2011) speaks of them as a change to the National Curriculum to specify 'a tighter and more rigorous model of knowledge' which reduced central prescription but focussed on mastering core subjects. The proposals encouraged the English Baccalaureate (E-Bacc) for 16 years olds. E-Bacc develops a benchmark beyond the %5A*-C (inc. English and Maths) that was the old main measure. The E-Bacc quantifies school performance on the percentage of its pupils who gain A*-C grades in each of the following subjects: English, Maths, Science, Humanities (History or Geography and not RE) and Languages (French, German, Spanish etc. but not Latin). The committee that proposed this change showed that those who were consulted ranked ICT as the most important subject not included in the E-Bacc (HC, 2011). The report commented,

> ICT skills particularly are an area in which developed nations should be looking to lead in. When taught well ICT is an enabling subject which improves the capacity of students and provides them with the tools required to function in a digital age. (HC, 2011:27)

New Labour had seen ICT as a significant part of the mainstream curriculum, supporting a range of equivalent qualifications designed to appeal to both practical and academic learners. The coalition did not include ICT in the E-Bacc, although it would alter this by adding Computer Science in 2013.

The old national curriculum programme of study for ICT was put it into a consultation process. By 2012 the indication from government was that it supported a return to the teaching of 'computer science' and programming rather than the more general ICT. By early 2013, this change of direction was apparent as 'computer science' was added to the E-Bacc in the science column. The focus on programming being taught at KS3 was done with the justification that industry needed it.

Conclusion

New Labour produced centrally planned curriculum initiatives. It built a KS3 curriculum that fitted together and allowed subjects to develop themes that flowed through them. The result of this prescription at KS3, was an explosion of choice at KS4 and KS5 with a wide range of possible qualifications. The Coalition went full circle and promoted changes that have had the effect of restricting the width of course style and encouraging more 'traditional' choices at KS4. Selwyn (2011) notes that there may well be a reluctance in the future to return to the New Labour approach towards educational technology and that it 'has had its heyday as a frontline area of state policy making', he commented,

> 'After 13 years of working with administrations that (over)privileged and (over)emphasised the educational importance of technology, it would be easy to be outraged by the Coalition's apparent lack of consideration and foresight for all things technological. Yet the acid test may well be whether a returning Labour government in 2015 would be inclined to reverse this decline, and return to a new era of heavily centralised bureaucracy and sustained state funding for technology in education.' (Selwyn, 2011:407)

Brundrett (2014) discusses the New Labour educational proposals for the 2015 election. In these proposals they argue that 'historically, education was driven by the economic and commercial needs of an economy' and while they do not support the return of widespread educational technology spending they do support 'education incubation zones' which would promote the use of technology and pedagogy. New Labour continue to argue for financial support for technology, pedagogy and improved communications to develop 'what the school of the future would look like' Brundrett (2014:354). New Labour supported central planning, research and the widespread availability of new technology, while the Coalition cut research and pushed choices to local decision makers. As Selwyn said,

> In the 12 months or so since their election, the Coalition has therefore presided over a withdrawal from educational technology policy-making that was as dramatic as New Labour's embracing of the area in their first year of office.' (2011:402)

This research examines whether a contraction in public sector finances has altered the view of the role of ICT within education for the senior leaders that I have interviewed.

A simple financial analysis would appear to show that UK State Schools were increasing their spending on educational technology in 2013 using a survey report commissioned by British Educational Suppliers Association (BESA), National Education Research Panel (NERP) and C3Education. The average spend in a UK secondary school was set to rise from £57,580 to £59,200; this change in expenditure would mean that the number of

computers in the average state secondary would increase from 228.2 to 329.2 (Besa, 2012b).

After all the political involvement and spending of recent years, some point to the UK as being behind others internationally (Tinto, 2003; Selwyn & Brown, 2007), while others (Hill, 2008) would claim that it is at the fore-front. This chapter has presented some of the wider political dimension behind technology in education. However, there are other factors, as Buckingham comments,

> 'The idea that technology in itself would radically transform education – and even result in the demise of school – has been shown to be an illusion. Despite massive expenditure on the part of the government and intensive promotion by industry, few teachers have made much use of technology in their teaching – and they have often resisted it for quite good reasons.' (2007:177)

If the strength of technology is communication then it is likely to provide the opposite of the Hargreaves forecast of fewer traditional skilled teachers. It would seem more likely to create a demand for 'professionals' at the other end of the communication channel who are capable of understanding and answering all the learning questions that are arising in real time. We should not ignore changes within the industry that are also having a practical effect. The last five years have seen the rise of 'free' software as a serious product; schools are moving away from expensive VLE software in favour of the free Moodle environment. Some schools are abandoning the payment of thousands of pounds to license popular office suites of programmes and are going towards the free open office environment. The explosion of blogs, wikis and free content

software are evident in most student essays and behaviour patterns. There has been a move toward iPads and Androids, with the creation of a marketplace for Apps, which can be built by very small companies and sold to a worldwide audience. Software economics favour Apps that are frequently created on tiny overheads using simpler programming languages than traditional software. Yet, as Buckingham pointed out research is currently failing to show a quantifiable effect of new technology and there remains an absence of a unifying pedagogical vision.

Chapter 3 - Technology, Economics and Pedagogy

The aim of this chapter is to provide an overview of the theoretical background and the two opposing pedagogical visions, between the Edutopians and Dystopians, for the role of ICT in the classroom. It illustrates how the narratives of globalization have been adopted into the debate and ends with an overview of the evidence based policy research that came from the British Education Communications and Technology Agency. BECTA has now been disbanded and I hope to be able to discover, in later chapters, the extent to which some of the policy discourse encouraged under them has been retained.

The Edutopian pedagogical narrative

In 2002, the George Lucas Educational Foundation published a book entitled Edutopia (Chen and Armstrong, 2002). The Foundation has lent financial support to a website, http://www.Edutopia.org/ and various outputs into social media, including a YouTube site https://www.youtube.com/user/Edutopia. They are covered with banners containing announcements like 'how to plan transformational lessons' and 'planning the best curriculum unit ever'. Both are full of references to project based learning, lifelong learning, and innovation being the rule and 21st century skills. The YouTube page tells us that it is

> ‘a place of inspiration and aspiration based on the urgent belief that improving education is the key to the survival of the human race. We call this place Edutopia, and we provide not just the vision for this new world of learning but the real-world information and community connections to make it a reality.’ (Edutopia, 2014).

George Lucas is not alone; Bill Gates (1995) argued that the ICT revolution had not really started yet, as a revolution built on changing typewriters to word processors was hardly a significant one. He promoted a world of real revolution where computers would bring significant change to a whole range of businesses, including schools. Advocating a world where the teacher is freed from paperwork and marking, and can concentrate more on interacting with students and from that provide the mass customisation of their learning. The concept of mass customisation is drawn from the software industry where *Amazon* present millions of users with individualised recommendations and other sites like *Notonthehighstreet.com* allow the customer to order from a range of personally customised and simultaneously mass produced items.

The MIT mathematics professor Seymour Papert (1993), in a book on rethinking schools, suggested that a surgeon from 100 years ago transported to a modern operating theatre would be lost about what to do or how to help, but if the same happened to a teacher he could continue seamlessly from where his modern peer stopped (an analogy challenged by Facer as cited in the previous chapter under the section *A change in priorities*). Papert, since the publication of Mindstorms (1980), has been a key advocate of the role of technology in learning.

Betham and Sharpe argue that it is important to develop networking and ICT facilities in our schools because of the practicalities of preparing students for jobs that have been changed by the demand for higher levels of ICT use and due to the way that technology has hit educational institutions in how they organise themselves.

> 'Schools and colleges are networked in a way that cuts across traditional institutional sectoral, and even national boundaries: if not yet completely 'borderless', the walls of the classroom are increasingly see-through. Learners are more mobile between institutions..'(2013:5)

As they observe all this requires better digital systems. The same type of thinking is reflected by Michael Fullan (2013) arguing that there are the competing factors: of 'push' where schools' are becoming boring for students and alienating for teachers as they seek to preserve a traditional non-networked ICT dynamic; with competition from 'pull' factors, where students are being drawn into learning in an ever-alluring digital world. Fullan (2014) cites an example of three schools who had 'no plan at the outset' for what they were about to do and who set 'every classroom in all three schools abuzz with learning' by passing a policy of bring your own device (BYOD) and encouraging a culture of 'yes'. Fullan (2014) gives this as an example of unplanned change that comes from the digital revolution. Buckingham notes how this same visionary language is not lost on the commercial companies in the British Education Training and Technology (BETT) show.

> ‘The straplines of individual exhibitors reinforce this almost mystical message: ‘lighting the flame of learning’ (Promethean); ‘inspiring creativity in the classroom’ (Smoothwall); ‘share knowledge, spark brilliance’ (Adobe); ‘transforming the future’ (RM). Even the DFES partakes of the same rhetoric, albeit in slightly more muted terms: technology is about ‘creating opportunities, realising potential, achieving excellence’. Learning via technology, it is repeatedly asserted, is ‘fun’, exciting and motivating for young people in a way that more traditional methods are not.’ (Buckingham, 2007:6)

Fullan cites Rosen (2010), ‘Children today hate school, because they learn very differently than the way that schools teach them.’ (2013:13). He devotes an entire chapter to the need for new approaches to pedagogy that draw on both technology and change (indeed, the book is titled ‘Stratosphere’ after this idea). He argues from a Constructivist standpoint, that students learn best when they can draw from and link with their subjective self. He believes knowledge and creativity often depend on intrinsic motivation and that this depends on how they link to the self. Fullan cites Wagner,

> ‘what you know is far less important than what you can do with what you know. The interest in and ability to create new knowledge to solve new problems is the single most important skill that all students must master today.’ (2012:142)

A trend advocated by Wagner, Fullan and Prensky (2012), as they predict a future where technology allows more project based learning, more partnered and peer learning and less dependence on a teacher as a giver of knowledge. They suggest the role of the teacher will move

into being a resource enabler who acts as a guide and is made more effective by technology. Fullan (2013) cites research sponsored by Microsoft's PIL (Partners in Learning Initiative) which identifies the following key drivers for digital success: firstly, innovative teaching practices consisting of student centred pedagogy, extended learning beyond the classroom and ICT use for specific goals; secondly, teacher collaboration in a focussed way; thirdly, professional development that involves the active and direct engagement of teachers; fourthly, school leadership with vision and including innovation in appraisal; fifthly, system focus and support; sixthly, linking everything except factor 5 to specific learning outcomes. At the conclusion to Fullan's (2013) argument about the need for technology is a graph drawn from Lee Jenkins' survey (Quaglia, 2012) of 2000 teachers from across the 'grade' levels and purporting to show enthusiasm for school.

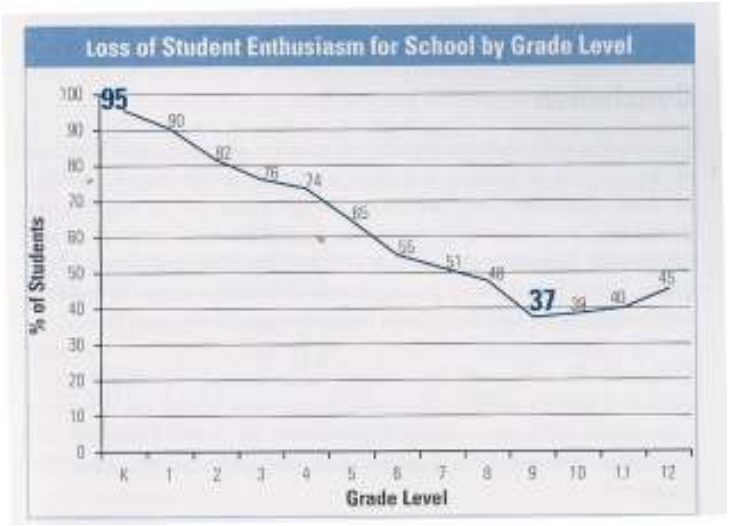

Figure 2 – Loss of Student Enthusiasm for School by Grade Level (Fullan (2013:29))

Fullan's use of constructivism reflects that in the earlier work of Seymour Papert. Buckingham (2007:36) notes that Papert was a follower of Piaget and reinterpreted some of his ideas. Papert

picked up the emphasis on a child needing to internalise and actively engage with the process of learning to be able to create meaning. Buckingham (2007:36) argues that Papert, drawing on Piaget like Fullan and Wagner, sees the role of the teacher as a facilitator or enabler of learning and that the child should be free to learn without deliberate or 'traditional' teaching. However, Papert reinterprets Piaget by arguing that instead of waiting for the child to develop at their own rate we can improve or accelerate this process by using computers. Papert, unlike Piaget, picks up on the need to improve emotional and bodily aspects of learning and sees a role for computers in this. He argues about the emotional delight drawn from controlling a logic device and the creativity that is spurred from learning to program. Buckingham notes the importance to Papert of learning to program using languages that stimulate thought and creativity rather than the more instructional and mechanical programming languages. Papert was, therefore, a strong advocate of the use of LOGO in schools, rather than BASIC. However, these claims from the Edutopian school are disputed. Cuban says,

> ‘Furthermore, there is simply no persuasive body of evidence that children learning to think procedurally or conceptually can transfer that learning to other settings. In a stinging rebuke to the notion of transfer, another computer scientist, Joseph Weizenbaum, responded this way to an interviewer’s query about how computers improve children’s problem solving abilities: ‘If that were true, then computer professionals would lead better lives than the rest of the population. We know very well that isn’t the case. There is as far as I know, no more evidence programming is good for the mind than Latin is.’ (1986:94)

In addition to Edutopians drawing on modernity and digitisation they equally rely upon a set of economic arguments around globalisation to build a narrative to support their pedagogical vision.

As I have shown, the Edutopian argument builds a narrative in which the current schooling system is seen to be failing. Any pedagogy that promotes its ability to be transformational and inspirational, intentionally or otherwise, suggests that the current system is not doing those things. I have quoted Edutopians that present the existing school system as an outdated manifestation of the factory system. They equate what is being advocated with modernisation and responding to change.

The Edutopian argument on globalisation and a knowledge economy

The Edutopian looks for pedagogical change and draws on the ideas of modernisation and the ability to use ICT to give learners the illusion of personalisation on a mass produced product. They argue that we need to utilise this technology in school because this will engage and inspire in a way that teacher led 'traditional' teaching doesn't. The Edutopians bolster their argument for modernisation and needing to change by borrowing from broader narratives around globalisation, where our economic position is presented as being under threat. It is argued that we need to improve our schools so that we can compete more efficiently in the marketplace. Keri Facer commenting on the dominance of this Edutopian narrative, says,

> 'the emergence of global digital networks, and the growing populations of China, Brazil and India are conflated with an account of the inevitability and importance of market economics to produce one all-pervasive orthodoxy: that social and technological change in the twenty first century means that we have to adapt to a high-tech globally competitive world or risk economic or social oblivion. In this story, education's role is to orientate itself and its learners, as rapidly as possible, to adapt to this future.' (2011:2)

Betham and Sharpe (2013) introduce their book on *Pedagogy in a Digital Age* by drawing on the idea that as a society we are at some kind of cultural crossroads. They use the language of Manuel Castells and describe Western society as heading towards an '*information age'* which they summarise as 'a period in which the movement of information through networks will overtake the circulation of goods as the primary source of value.' (Betham and Sharpe, 2013:4) In 1999, Castells

links information networking with both globalisation and social development theories that have the appearance of drawing on the networking concepts of Ayn Rand. Castells posits that a new brand of capitalism has taken over the planet and it is being tooled by information and communication technology (ICT) as a root for its new productivity, its organisational forms and its effect on the global economy.

Castells' arguments for New Capitalism and technology draw on an historical structure that begins in the Second World War when necessity drove the creative work of Turing and Von Neumann, among others, in the construction of machines like Colossus for cracking German codes. In the mid-60s it took a further leap forward with the need for machines that could send man to the moon. By the mid-1970s, with IBM as the lead provider of computers, firms like Xerox created their PARC research institution (Palo Alto Research Centre) which would spawn much of what we view today as ICT (Hiltzik, 1999). At the same time as PARC began its bewildering series of inventions, the university careers of W. Gates, P. Allen, S. Jobs and S. Wozniak all spun out into the two companies of Microsoft and Apple that fuelled the revolution in technology that has altered our world. ICT also attracted the interest of governments with its ability to generate significant levels of income and reshape industries. Recent years have seen the collapse of established firms like Eastman Kodak as they failed to adapt to the changes brought by ICT. Similarly, it has seen the growth of whole new industries, with the convergence of advertising and social media forming many new and valuable companies. Facebook has supported the idea of social mobility for those who work hard; students can aspire to examples like Mark Zuckerberg who rose from obscurity to become the youngest self-made billionaire in history.

Castells argues that ICT networks draw people into them regardless of geography and circulate money, information, goods, services and people. The danger inherent in this networked world is that 'Those who remain inside have the opportunity to share and, over time, to increase their chances. Those who drop out, or become switched off, will see their chances vanish.'(Castells, 1999: iv) Part of this study looks at the role of networks and we have seen, in the previous chapter, how in 1990s and 2000s there was a sustained political attempt to foster better ICT networks between schools.

The move to this type of economy, is for some, not as simple as facilitating access to the a strong network infrastructure. Kozma (2005) and Heslop(2007) argue that schools play an important role in the economic shift within our society towards the knowledge economy. They see a changed economy which doesn't have barriers to entry into its market places and where movement of skills would be unlimited. In the place of tariffs and barriers, we would have an economy where transactions are conducted in cyberspace; one in which globalisation, innovation and knowledge are the main currencies. This Edutopian vision is one that is challenged within the Dystopian school, we have already noted the views of Facer (2011) in controverting a highly partial view of change.

Challenges to the globalisation argument

The economic arguments of the Edutopians are challenged by a range of authors (Facer, Selwyn, Buckingham and others) and I will expand on their pedagogical stance in the next section. The problem they face is that the narrative supporting an economic imperative linked to globalisation

has extended throughout much of the debate around policy making. If the politics within the previous chapter supports the view that a broad purpose of education is to supply the next generation of workers for the country, then a focus on technology is a natural consequence. The problem arises if we believe that education has a wider or deeper purpose. It might be useful to note at this point that the 1988 Education Reform Act (ERA) begins with,

> 'The curriculum for a maintained school (must be) a balanced and broadly based curriculum which:
>
> (a) Promotes the spiritual, moral, cultural, mental and physical development of pupils at the school and of society; and
>
> (b) Prepares such pupils for the opportunities, responsibilities and experiences of adult life. (ERA, 1988)

This legislation sees a higher purpose in our education system than simply producing employees. However, this does not mean that education should be disinterested or neglectful of students' future employment prospects.

Peters (2001) queries the real effects of using globalisation and ICT as the key drivers behind policy planning. He argues, like Facer, that there is a difference behind what makes economic sense, and what makes societal sense, and that often, by narrowly focusing on economic factors, it is easy to ignore the effect of policies on social inclusion. Others, such as Erumban & de Jong (2005), provide a cross country comparison that concludes the rates of ICT adoption within

countries are heavily influenced by different types of cultural factors.

> Since the mid-1990s the idea that we live in a global knowledge economy has come at least to dominate policy talk at all scales; institutional, national, regional and global. (Robertson, 2005:152)

After examining the policy rhetoric of the World Bank and OECD, Robertson talks about the divide created within their model by high value-added jobs and low paid flexible labour. She dismisses the overly romantic view of human beings as willing partners in a personalised learning agenda and questions the ability of technology to either package up all existing classroom learning, or to be able to integrate into professional practice.

Ozga (2005:59) points out that the globalisation agenda is being applied very differently across the world and many of these new technologies are not equally understood or equally available. She cites Soucek (1995) in showing that some of these global networks that provide international opportunities also often exclude those from participation who have low-skills, low-security and peripheral employment. Ozga (2005) highlights the work of Gewirtz and other studies (Echols et al., 1990; Moore and Davenport, 1990; Willms and Echols, 1992) that claim the market system of policymaking unfairly advantages the middle class. It is claimed, drawing on the work of Bourdieu, that education often has processes that disadvantage the working classes and that this market system is one such. Middle class parents find it easier to interact with schools and teachers and know the rules of the commercialisation better than their working class counter parts; therefore, children are advantaged on the basis of their parents' skills.

Ozga, Facer, Selwyn, Buckingham and others are not advocating a quasi-luddite return to a pre-technological age. They accept there is an economic reality to some of the argument but they do not feel that this inevitably leads to some of the conclusions of the 'Edutopian' school. Facer (2011:11) argues that we need to rewrite the relationship between education and socio-technical change. In the critique of the Edutopian narrative she identifies a range of factors that could drive a technological future in a different direction. Facer sees a world that is full of radical inequalities but one in which computing power is significantly increasing and always reducing in cost. The ever increasing demand for technology will bring us increasingly sophisticated machines that will aid our ability to communicate over huge distances and blur the boundary between the digital and physical. Facer envisages a different possibility from a knowledge economy that does not rely on increased individualisation and amassing personal wealth and which could address some of the issues of Ozga. It could mean that social inequalities are open to change in the face of ubiquitous communication as our networks will play an important part in our personal, social and institutional capital.

A more cautious or Dystopian pedagogical narrative

Just as there are doubts over the reliance on the inevitability and desirability of parts of the economic argument, they also exist towards the use of educational technology itself. Selwyn says,

> ‘An orthodoxy appears to have developed in most parts of the world that digital technologies are an integral and inevitable part of ‘modern’ forms of education, and therefore require little or no discussion. Certainly as far as many academic commentators are concerned, the only questions that need to be asked today of educational technology are technical and procedural in nature. How might we better ‘harness’ the educational potential of technology? How might technology use be more ‘effective’?’ (2014:2)

Cuban (2001) in ‘Oversold and Underused’ charts the history of the use of technology within the classroom. Cuban notes an ongoing cycle of a visionary claim, followed up by disappointment on the part of educators and sometimes even disillusionment. He spots a paradox in the protagonists who denigrate the current practice of education on the one hand and possess an enduring faith in the ability of schools to improve society as they place students on the path to financial well-being. Cuban comments, ‘critics of this wholesale embrace of market competition ask: is everything educational for sale? Is being a good citizen about nothing more than being a good consumer? What about the common good the founders of public schools and universities so fervently sought to foster?’(2001:11). He notes that test scores often dominate the talk about the performance of schools and this is accompanied by the language of an ‘information economy’. In the face of these

factors the computer has a natural place within the overall vision.

> 'No tool is better suited for those economic ends than computers. Securing more and better computer technologies for schools, so they can operate more efficiently and faster and support better teaching and learning, has been touted by corporate leaders and public officials as a splendid way to reform schools according to the market driven agenda of the past two decades.' (Cuban, 2001: 12)

Selwyn picks up the theme that digital technology and innovation have been one of the defining features of western society over the last thirty years, and he acknowledges Castells along with many other commentators who see digital technology as a key driver of their societal development (2014:5). However, Selwyn traces the roots of this line of thinking much further back, acknowledging the 'longstanding intellectual tradition' of seeing technology as the pinnacle of accomplishment stemming out of Enlightenment ideals of 'progress'(2014:13). Leo Marx (1994) comments on the 'heroic role' of technology in this pursuit with Selwyn of the opinion that only Nietzsche and Schopenhauer could be considered not to be optimistic about the role of technology in modern life.

Facer views the 'Edutopian' narrative as a myth due to the absence of empirical support. She thinks it is dangerous that, because technology is often presented as inevitable or incontestable, it is often accepted as unchangeable. She says that the argument, which poses education as fundamentally utilitarian in that it solely prepares young people for economic life, is also highly

debatable. Selwyn puts it more strongly,

> ‘educational technology is not a neutral force for good that simply needs to be used in the ‘right’ or ‘best’ way to pay dividends. Instead, educational technology should be seen as a vehicle of ideological agendas that subtly shape what educational technology is, and what educational technology does.’ (2014:15)

Buckingham (2007:40) discusses some of the thinkers that have challenged the role of technology, citing those who have written against its dehumanizing effects (Mumford), its overdependence on rationality and efficiency (Ellul/Rosak/Postman) and its poor ecological credentials (Bowers). Buckingham quotes from an ‘Alliance for Childhood report’ where they challenge the use of computers in education. He says,

> ‘they argue that they result merely in ‘computer-centred education’. Computers lead teachers to place a premature emphasis on cognitive skills... Real, hands on experiences are replaced by computer simulations. The computer turns the classroom into something resembling a workplace, as children are distracted by the superficial interactivity of electronic books and numbed into ‘information fatigue’ by the world wide web.’ (2007:47)

At first, it is easy to sweep away the arguments of the report or Selwyn as merely those of Luddites who are resisting the inevitability of progress. However, the Dystopian critique is given weight by some on the Edutopian side of the debate as they acknowledge, ‘when we consider

technology and schooling, we are in for much more digital disappointment.'(Fullan, 2013:36) He proceeds to cite a set of damaging statistics for Edutopians, for example 'only 8 percent of teachers fully integrate technology into the classroom' or 'only 23 percent of teachers feel that they could integrate technology in the classroom.'(Fullan, 2013) Some (such as, Buckingham(2007)) argue that the failures of ICT to deliver in practical terms, which are highlighted by Cuban (2001), NESTA (2012) and others, are part of a rejection by professional teachers of an over-simplified view of the potential for technology in the classroom.

Buckingham comments, 'the debate about technology in education has often been conducted in quite absolutist terms. Either you are 'for' or you are 'against'.'(2007:48) but, all this does not seem sufficiently nuanced. Technology, however brilliant, rarely allows us to engage in new forms of activity that were previously impractical or inconceivable, instead it tends to improve existing methods of doing a given activity and enable it to be done in a more efficient or simpler manner. For example, electronic registration systems contain the same data as the manual systems that they have replaced, but they are considerably more efficient at identifying patterns within the data and it is much simpler for teachers to be able to interrogate this on a daily basis.

BECTA (British Educational Communications and Technology Agency)

The debate around pedagogy between Edutopians and others has not been characterised by the contributions of many active teachers or school-based decision makers. Yet, my own experience and some of the responses in this study show that school leaders were aware of the research from BECTA. There may be many reasons for this dichotomy; perhaps the government funding of

BECTA research meant that it was well publicised and readily available in schools. The awareness of BECTA amongst the interviewees in the study is, on its own, a strong reason for providing a short overview at the end of this chapter.

After the election of New Labour, as we saw in Chapter 2, there was a significant rise in central funding for technology. The increase in spending on ICT was part of a political attempt to bridge divisions in society and to promote social inclusion. Indeed, e-services crept across a range of other public service institutions, such as, social security, health and welfare (cf. Selwyn, 2008:702). Selwyn thinks that the New Labour policy around the digital divide was driven by its symbolism of being able to break down other social barriers,

> 'one of the most intriguing aspects of recent social policy formation in countries such as the UK has been the convergence of the information society and inclusive society discourses into ongoing popular and political debates over the potential of ICTs to either exacerbate or alleviate social exclusion.'(Selwyn 2004:343)

In practice, the Blair government seemed to have accepted some of the 'Edutopian' rhetoric, as the election manifesto for 1997 promised to 'realise the potential of new technology' within education. However, there were repeated concerns over the uniformity of access to technology and the potential of a digital divide (cf. Selwyn, 2004:344). In order to support policy making and promote the government's view around the potential of ICT in transforming education they established BECTA. BECTA's approach to school improvement and policy involved commissioning a range of organisations and academics to write studies on many areas of school practice in

technology. (A unique aspect of this study is that much of the existing spending research by BECTA was conducted mainly in the South of England (BECTA, 2006, 2006b, 2007, 2008, 2008b), whereas this is based in the north.)

The initiatives supporting the deployment and use of ICT were led by the innovation unit of the DFES and from BECTA, 'who were a government funded body charged with advising on the implementation of its ICT strategy' (Buckingham, 2007:12). BECTA operated in a similar way to the JISC (Joint Information Systems Committee) and alongside charitable, voluntary and private sector organisations, such as, Futurelab and Microsoft Learning (Selwyn 2008:705). BECTA advised on policy, together with Futurelab they supported research, while Demos (a think-tank) also had an input on policy initiatives. BECTA with its policy remit, would commission academics to conduct a range of primary research in the area of ICT in schools. The BECTA reports would highlight a diversity of issues, from what was perceived to be 'good practice', to issues around fragmentation and underutilisation, or the reliance on a small number of software suppliers (cf. Buckingham 2007:57). BECTA supported a wide range of research, some of which wasn't directly linked to implementing actively a particular policy, for example, they commissioned research and small scale projects around the use of educational games and learner motivation (cf. Buckingham, 2007:113). BECTA sponsored a variety of research endeavours to look at practice around spending decisions (BECTA, 2006; BECTA, 2006b; BECTA, 2007; BECTA, 2008; BECTA, 2009). In addition they had supported academics in similar studies (Crook, 2010; Cox, 1999; Butt and Cebulla, 2006; Chowcat, 2008; Condie and Munro, 2006; Hartnell-Young, 2008; Jones, 2004; Scrimshaw, 2004; Sinclair and Mortimer, 2007; Underwood, 2009).

In 2010, one of the first practical effects of reducing government spending was that BECTA as a QUANGO was targeted for abolition and its funding was finally withdrawn in April 2011. A study issued by the National Endowment for Science, Technology and the Arts (NESTA), an independent charity, in 2011 analysed a range of research papers on the use of technology within education. Its finding led Graham Paton, the education editor of the Daily Telegraph, to write,

> Many other schools are allowing millions of pounds' worth of electronic items to "languish unused or underused in school cupboards", the researchers found.
> The conclusion, in a report by NESTA, a charity created to support innovation, comes despite concerns over cutbacks to school budgets during the economic downturn.(Paton, 2011)

Decoding Learning (NESTA, 2012) remained positive about educational technology and stressed the potential for it to transforming learning. The report didn't lapse into scepticism about the true benefits of the spending that had taken place, which is surprising given the overall context,

> 'many of the educational and technological issues that the New Labour ICT agenda purported to address can be said to remain as problematic in 2008 as they were in 1997. This was illustrated in the official admissions towards the end of the Blair administration, for example, that 'only one in six schools and colleges are getting the full benefit of using technology in a truly effective way' (Crowne, 2007), that initiatives such as *UK Online* were making little difference to social inequalities (UK Online, 2007) and that the UK continues to fall behind other comparative countries in ICT skills (Leitch, 2006).' (Selwyn, 2008:705)

Selwyn thinks that this highlights the lack of evidence for ICT altering the nature of the education as policy planners had intended and that BECTA failed in its objectives to inform a government policy to 'realise the potential' of technology. Similarly, you may also deduce his view that the report damages the broad claims of the Edutopians. I believe that to read the NESTA report in this way would be to fall in the pattern of being 'for' or 'against' that was mentioned earlier by Buckingham (2007). In assessing the legacy of BECTA, we have to recognise that sometimes the proponents of an Edutopian vision can appear to over simplify and ignore the absence of empirical evidence for their claims. The 'institutional factors', from NESTA, that stand in the way of progress may be professional teachers seeking a fairer socio-technological future. A useful aspect of NESTA's work is to raise questions about the micro context within a school and the need for local decision makers to learn from existing studies.

Conclusion

Despite all the policy guidance from BECTA and the claims from the Edutopian side of the debate there remains little evidence of success in improving educational outcomes from all our new technology. Greenfield (2014) is one of a number of academics who are disenchanted with the Edutopian arguments that accredit technology, rather teaching, with the power to improve schools. Edutopians, like Fullan (2013) are refocussing their arguments on the leadership of technology in schools rather than quantitative outcomes. Fullan devotes a whole book to the role of the principal in maximising the impact of change and the way that leadership has to cope with the pressures of a tightening focus on standards, while allowing technology to flourish.

The aim of this study is to ascertain whether a contraction in public sector finances has altered the view of the role of ICT within education for my group of schools and academies. To explore this aim, I have focused on three key questions: firstly, who makes the ICT spending decisions; secondly, what processes and priorities are used within that decision making; and thirdly, what wider political issues affect those decisions. The first key question reflects back into my methodology as it assists with the decision about who to interview. An Edutopian, such as Fullan, believes (2014:147) we are in the early phase of a spectacular learning revolution that will operate as a type of organic change with naturally occurring patterns. He presents a model of change, where school leaders simply follow and engage in 'meaningful work with others', with the effect that their decisions are not based around planning but instead around enabling change. Dystopians like Selwyn (2014), would admit that their scepticism should not be seen as nihilistic negativity but rather it is designed to help you to consider how 'education, technology and society might be made fairer' (2014:19). Facer (2011), sets out to show that schools can do more than just prepare students for a 'knowledge economy'; instead they can help to build a 'fairer socio-technical future'. Now that the academic and political background has been established I will proceed to my methodology and then explore how the issues are reflected in the views of my interviewees.

In presenting the interview responses, I have not sought to validate them by conducting further sessions with other members of the leadership team, governors, or teachers within their institutions. In the introductory chapter, I explained how schools are led and the purpose of this research is to discover how each of the leaders views the decisions they have made and what was

driving those choices. Other teachers, and even other leaders within the school, may have views on the 'leadership style' they have used, or the 'effectiveness' of their choices, but none of them would be able to comment fairly on their thinking and the pressures they felt. For the second key question it is equally important, in a climate of reduced finance and local responsibility, to look at the processes and priorities that are shaping their actions. Finally, the third key question enables me to examine not only who is making the decision, but also what wider issues are shaping those choices. I intend to explore how my interviewees have internalised academic and political discussions and how they have shaped their view of ICT spending.

Chapter 4 - Methodology

Now I will look more specifically at the views of my interviewees and address the aim of this research as to whether a contraction in public sector finance has altered the view of ICT in education.

Before, I provide an outline of my perspective on the nature of evidence and my role as a researcher, I will explain why I have chosen a small scale qualitative study and why I believe that this is an appropriate methodology given the nature of the positions held by my interviewees. I delineate how I recruited my interviewees, how I contacted them, the response rate and the nature of the data gathering. Then I breakdown how I analysed the responses and provide some brief biographical information to allow the reader to understand more about their experience. The biographical information could be included in Chapter 5, but I have chosen this chapter as it allows for judgements to be formed about sample composition and issues such as gender. While this section is more practical than the previous chapters, nevertheless, it covers some areas that have been equally debated and it outlines my response to them. Reciprocity exists in terms of the time each school invested in the research process. Each of the interviewees has given up between thirty minutes and one hour of their time, I hope that the usefulness of the findings will help to repay that investment. At a time when the government are encouraging 'decentralisation' and 'local decision making', alongside a budget regime with academies, that devolves all spending to the school level, then there is an even greater relevance to a study based on building a shared understanding of some of these processes. The leaders making decisions are in danger of becoming professionally and socially isolated from one another and this research helps to form

material to facilitate communities of practice. I hope the research will allow the sharing of expertise and thinking to those involved and this could then facilitate beneficial changes.

My role as a researcher

In the introductory chapter, I identified my own background as a senior leader within a secondary school. This section will expand a little on my experience to give a fuller perspective. I have worked in this area for eighteen years. In my first school I became a Head of ICT and would be asked to present papers to the leadership team and governors to support expenditure plans. At my second school I sat on the senior leadership team and had direct control over a substantial specialist school budget that allowed me to purchase equipment and technology throughout the institution (particularly, in Mathematics, Science, Design and ICT). Here I chaired a strategic leadership of ICT group that drew from a range of middle leaders and reported to governors on the effects of spending. Now in my current school, I sit on the senior leadership team of a multi-academy trust and have overseen expenditure on technology throughout the three schools. One of the academies is a studio school that specialises in digital technology and across the trust we have opened up 'Bring your own device' schemes to students. I was provided with suggestions about expenditure in each of these roles by middle and senior leaders and I would seek advice from the network manager. I would report on spending and listen to the views of both the governors and a small committee of staff interested in curriculum technology.

The options of a quantitative or qualitative study

Repeatedly, throughout the second and third chapter, I have cited the views of both Edutopians and Dystopians and shown how the latter point to an absence of robust empirical evidence for the impact of technology on attainment. The nature of the evidence permitted by both sides of the debate is open to discussion, for example, in a BECTA overview of the impact of ICT on attainment we read,

> 'There are few studies that attempt to discern a direct, causal relationship between ICT use and attainment, although many identify improved attainment as one of a number of outcomes of increased ICT use. Unfortunately, it is not always clear how attainment is defined or measured in some of the research reports. In some, 'attainment' refers to performance on standardised tests while in others, the definition is broader and impact relates to observed improvements in pupils' understanding within specific subject areas, that is, domain-specific cognitive development.' (Condie and Munro, 2006:22)

The two authors proceed to argue for quantitative evidence for the impact of ICT in the belief that it renders a more 'valid' proof. In their presentation of the evidence they start with quantitative studies and wish to be less reliant on 'softer' qualitative work.

> ‘In discussing the relationship between ICT use and attainment, more weight has been given to those studies that used standardised tests or similar reference points, while those drawing conclusions on the basis of the arguably ‘softer’ evidence of teachers’, parents’ or pupils’ perceptions of improvement in performance have been used to elaborate upon or supplement the findings.’ (Condie and Munro, 2006:22)

They then point to the quantitative work of Cox (2003) and Passey (2004) as being valuable, while being forced to admit that both those authors highlight the role of other variables, particularly teacher pedagogy, as having a major influence on the attainment outcomes. They identify a range of studies which are statistically based but fail to show a significant impact. This leads the authors to the conclusion,

> ‘Overall, the evidence on the impact on attainment of learning through ICT remains inconsistent, however. Many of the reports of a positive impact are based on case study research, much of it drawing on the perceptions of teachers and others.’ (Condie and Munro, 2006:23)

The problem that the authors face is in what they are prepared to accept as knowledge. The authors seek to present a ‘scientific’ set of variables to ‘evidence’ impact, but yet the classroom environment does not easily lend itself to this type of positivist variable based study and it is difficult to isolate each of the variables to show their significance in the work. The authors think that the evidence supports an impact if ICT is a regular part of learning, although they think that the evidence is insufficient to draw firm conclusions.

> ‘Some of the evidence from small scale, primarily qualitative studies, is less robust, but even where attainment is clearly defined and standardised tests are used, isolating the impact of the ICT use on attainment is problematic. Schools and classrooms are involved in any number of initiatives designed to improve performance and attainment, making it difficult to identify the impact of individual projects or interventions.’
> (Condie and Munro, 2006:24)

The nature of the evidence that is acceptable is as contentious, to these authors, as the debates surrounding either pedagogy or the ideology behind policy. Neil Postman’s book Technopoly, subtitled the surrender of culture to technology (1992), uses the term to identify the convergence between technology and ideology. Selwyn (2014:25) expands on the link between technology and a range of ideological positions, from libertarianism, to new-liberalism and the new capitalism (cf. Apple 2001). We have seen how ideology has shaped policy, how there are a variety of positions around pedagogy and real difference in the academic debates over methodologies and evidence. Despite the attachment of Condie and Munro to a quantitative study, they see that there is a place for other qualitative data when examining leadership.

> ‘Leadership and management are significant factors in the extent to which policy becomes practice and developments in ICT become embedded into the life of the school and experiences of staff and pupils. Much of the literature encountered in this study focused on the experience, attitudes and beliefs of those with formal, structural responsibilities within schools.’ (Condie and Munro: 2006, 13)

I have followed a more qualitative approach and I believe that this will provide a clearer perspective on the motivations and thinking of my small group senior leaders than would have been possible from any detailed study of their actual spending habits. This move towards qualitative work is supported by researchers on both sides of the academic debate. The Edutopian author of the book 'The Thinking Teacher' is Oliver Quinlan, whose webpage (www.oliverquinlan.com) is subtitled learning, teaching, technology. Speaking on behalf of the National Endowment for Science, Technology and Arts (NESTA), he recently gave a speech at a National Association of Advisors for Computers in Education (Naace) conference[1] and started by pointing to the lack of 'empirical' evidence of the benefits of technology. Quinlan defends the use of robust narratives from parts of the profession to evidence the effect on attainment (Quinlan, 2015).

No researcher operates free from an epistemology. The epistemology within a piece of research is not just a guess on the part of the researcher but is a deep seated expression of what they accept as reality. The concern is that presenting the views of interviewees, it is possible to subconsciously prioritise the expressions that support the interviewer's perspective. Chalmers (1996) shows the danger of assuming that a quantitative scientific method is free of presuppositions. Its empirical emphasis on the neutrality of statistics formed from observation is naïve at best. Research extrapolates phenomena to make an account, but in doing this the account is only as good as the extrapolation.

[1] Naace are an ICT association that has members who are teachers, consultants, technologists and policy makers. They are Edutopian and wish to 'share a vision for the role of technology in advancing education'. As a professional association, they feel they 'represent the voice of the UK education technology community in the schools' sector at a national and international level'. As a professional association they provide conferences to exemplify practice.

> We cannot be one hundred per cent sure that, just because we have observed the sun to set each day on many occasions, the sun will set every day. We cannot be one hundred per cent sure that the next dropped stone will not 'fall' upwards. Nevertheless, although generalisations arrived at by legitimate inductions cannot be guaranteed to be perfectly true, they are probably true. (Chalmers, 1996:17)

The approach is dependent on the observation record of an unprejudiced and unbiased observer. The experiments of Heinrich Hertz in testing radio waves, shows that the fault in his experiments was never resolved in his lifetime because it lay with the presuppositions that he had made in his understanding of scientific laws and that his 'unbiased' experiments were being contaminated by his laboratory. (Chalmers, 1996:33).

I believe that neutrality is impossible in any presentation of research in this field. The claim to be completely objective or value free when deciding the issue is absurd. The evidence that is admitted – quantitative or qualitative, how it is subsequently arranged and then evaluated incorporates a set of past experiences and personality. Morrison, commenting on the process of educational research, reflects that research takes place within a set of differing paradigms which define 'normal' research,

> In making sense of research information and transforming it into data, researchers draw implicitly or explicitly upon a set of beliefs or a paradigm about how that analysis might be patterned, reasoned and compiled. (Morrison, 2002:12)

There are a set of presuppositions in where we look for evidence and in the nature of the questions we ask that contain a certain prejudice towards the answers that we expect at the outset. I have sought to limit this by quoting liberally from the interviews and not obscuring comments that don't fit particular groupings within the findings. Chalmers' (1996) argument is that despite seeking objectivity our findings are always relativistic as they are based on the world we understand. To avoid the suggestion that I have selectively quoted from the interviews I have placed several anonymised transcripts of interviews in an appendix. I have also limited bias by working closely with the supervisory and ethics team at Keele after I had conducted a trial set of the interviews in another neighbouring county. The university research process has allowed me to assess the questions with senior leaders in a pilot study and to alter any unintentional wording in questions that seemed to lead the interviewees in a particular direction. I will explain this process and the changes it created in more detail in the subsection of this chapter on the use of interviews.

Why I chose a qualitative study

I aim to discover whether a contraction in public sector finances has altered the view of the role of ICT within education in a group of schools and academies in the same geographic area. I want to highlight the thinking and the views behind the decisions and how they are swayed by reduced budgets. I feel that by presenting their experience, attitudes and beliefs, I am more likely to be able to show their perspective on who is making the decisions about ICT spending in each of their schools. They will provide the narratives around the process and priorities that they have used and then they will be able to explain how they perceive the political ideologies and academic debates have affected their actions.

Locating a research strategy based on what is being studied rather than a preferred method runs counter to the 1960s' doctrinaire stance on certain qualitative approaches. Punch (2009) suggests educational research strategy in the 50s and 60s tended support large scale statistically based quantitative research, and along with other areas of social science, since the 1980s there has been a move towards this type of small scale qualitative approach. This movement recognises the difficulties in planning and validating large scale projects and has improved the understanding of the ability of small scale projects to provide insight into professional practice. He terms the attachment to a particular method that characterised some groups of research as 'methodolatory' and views this pre-eminence of method as wrongheaded. He encourages the researcher to focus on the research question and use that to determine the approach. Punch comments,

> In previous decades of practice in education and other professions, practitioner involvement in research was restricted to the role of 'consumer' rather than 'doer'. The thinking behind this was that the practitioner did not have sufficiently advanced training in research methods. More recently, there is a new emphasis on, and new conceptions of, continuous professional development for practitioners leading to new types of involvement for practitioners in research.' (Punch, 2009:40)

I am not attempting to build an hypothesis about what makes for 'good' or 'bad' spending, or build an ideological case that is either 'for' local/national or 'against' a centralised/decentralised approach, I am simply trying to present a fair account from my interviewees of their decisions;

what factors influence their views; the processes they are following; and what choices they exercise as a result.

All the individuals in this study have a 'professional identity'. Holstein and Gubrium (2000) have produced a useful overview of the discussions involved in the study of the 'professional self'. However, this research is not designed to be about 'professional identity', rather it is presenting the findings from a set of interviews to seek a broader understanding about what they are doing and what is influencing those actions.

Piloting the study

Prior to this study I conducted a pilot study in a neighbouring county with a similar group of head teachers. The pilot was a chance to trial the questions about technology and ascertain what type of questions drew out the fuller responses. The experience of the pilot studies taught me that there was a greater personal commitment to the process of an interview than to a questionnaire methodology. As the work favoured a close study of the subjects' perspectives and the ways that they had imposed their own meaning on their decisions, this lent itself to a semi-structured interview that allowed for greater exploration of issues and responsiveness for the process of data gathering. The use of a semi-structured interview allowed me to interact sensibly with the views being expressed while probing the interviewee when I felt that there could be more depth required in the answer, and to skip questions that I thought had already been addressed in a previous response.

The use of interviews and the process involved

There is a body of research published by the NCSL, which is relevant to the methodology for a topic around ICT budgetary decision making. Heslop (2007) examined the management of knowledge capital and has a whole section on 'the promise of new technology'. Perhaps more relevant is the research by Gill (2007), a head teacher of Rode Heath Primary School in Cheshire, into how five different primary schools led change in ICT to support learning. This study presents its findings by a collating the responses around a set of themes and using semi-structured interviews as the method of data collection.

Burton, Brundrett and Jones (2014:134) acknowledge the way that semi-structured interviews allow the researcher to guide the interview to ensure it covers the key issues and produces a rich set of data on the topic. They acknowledge it is a method that works best in a relaxed and private atmosphere, a factor that is reflected in my use of the personal offices and homes of the respondents. For McNeill (1990:124) the downside of this method is that it takes time both in the field and then in transcribing the interviews and classifying responses to identify themes. Bell (1993:92) acknowledges this downside but feels it is counteracted by its adaptability in probe responses. She advises the inexperienced interviewer to retain the structured format of their questioning. Burton, Brundrett and Jones (2014:137) draw out some of the theoretical literature that looks at the overall structure, with the use of introductory questions leading to more detailed and reflective ones and differentiating between main questions, probes and prompts. Punch (2009:150) was very helpful in guiding my approach on both the pilot and the field work. After an overview of the theory around different interview methods he gives realistic advice by explaining the importance of both listening (referring to the literature in Woods (1986), Keats (1988) and

McCracken (1988)) and developing suitably worded and sequenced types of questions (referring to the literature in Patton (1990), Foddy (1993) and Minichiello (1990).

The questions I chose to ask each of my interviewees, together with their responses, were designed to last about an hour (See appendix 1). In reality, some of the interviewees concluded the process within a forty minute time slot and others took longer. The logic behind curtailing the interviews to an hour was that it would fit with the normal timetabled length of a typical school lesson which made the process more acceptable to people with teaching commitments and busy diaries.

Bell (1993:92) cites Cohen (1976) who likens interviewing to fishing, saying it requires careful preparation, much patience and considerable practice if the eventual reward is a worthwhile catch. Punch (2009) supports the system used by Patton (1990) for classification of questions in interviews as: *behavioural; opinions/beliefs; feelings; knowledge; sensory; or about demographics and background*. At the pilot stage, I had 10 questions aimed at the head teacher that were all mainly behavioural or based on feelings, e.g. 'How happy are you with the technical support provided in the school?'. I asked other pilot questions that were less defined and would compound feelings with beliefs, e.g. 'How happy are you with your teachers' use of ICT within the classroom and what role does it have in improving education?'. At this point, I was also following a methodology that asked the bursar or technical staff a further 27 questions that were primarily *background* and *demographics*, such as, 'What is your ratio of PCs to pupils?' and occasionally explored *feelings*, e.g. 'How reliable is the network?'. I supplemented the interviews with a questionnaire and the approaches on the pilot led me to conclude that the quantity of data being gathered was not helpful and that the direct interview with the head provided the most

interesting responses. I compressed all the lines of enquiry into sixteen questions that began with *background* ones and then probed *knowledge*, e.g. 'have you made any major investments on ICT recently?' or the size of the budget and the % changes in it. I signalled a change in tone with a third question that combined *knowledge* and *behaviour*. Question 4 took an entirely different approach and asked a key *belief* based question. I then reverted to *behaviours* with Question 5 and 6 before changing to *opinions* and *feelings* with 7 and 8. I moved to a set of questions looking at *feelings* on organisational *behaviours*, before some tighter *behavioural* questions in 13 and 14 and then reverting back to opinions in the final two questions. I took time over the wording of the schedule and received extensive advice from my doctoral supervisor. The structure of the schedule was designed to avoid working through the list of themes and to use a more recursive process that revisited each of the three main strands in different ways at different times. The early questions followed the approach suggested in Punch (2009:148) about accessing the setting, locating the informant and gaining trust, the early *knowledge* questions were placed at that point as a means of establishing rapport and then the move into question 4 allowed me build on this base and begin to explore beliefs. I wanted to avoid any series of *feeling and belief* based questions, so after this key response I broke the questions up with *behavioural* and *knowledge* ones, before asking for further *opinions* and *feelings* in questions 7 and 8.

The interviews usually took place at the subject's school and often in their office: although, one of those involved wanted to be interviewed in the empty school canteen where it was less likely they would be interrupted; another interview took place in an empty classroom; and one of the interviews was at the home of the participant. The interviews were all timed to take place

between April and July 2012. The choice of the summer term was based on a knowledge of the increased availability of the senior leaders following the departure of examination classes.

I have deliberately restricted the data gathering to secondary schools within the single county, with an awareness that large sampling to draw country wide results is beyond the capacity of a research project of this nature. Limiting the exploration to one county had its disadvantages, since a restricted sample has meant that I needed to consider whether the data was being affected by socio-economic factors in the arrangement of the student body; especially given the similarity of the composition of many schools in the area. It could affect the broader validity of any conclusions, as the research does not claim to have any 'truth' beyond that of its restricted sample. It has several advantages: firstly, the sample set is convenient and did not involve a significant degree of travel when I visited the schools; secondly, I had an 'insider' access to most of the schools and gaining their views and data was much easier than it would have been otherwise and the quid pro quo of this was that it makes the sample more open to questions of bias; thirdly, the research material has relevance in my own employment; fourthly, my knowledge of the broader context of the schools has assisted in understanding their social, cultural and micro-political aspects that may have been easily be missed in a wider study.

In planning the interviews following the pilot study, I opted to add an opener that was designed to settle the interviewees by asking about their role within their school and the background of their career. It provided a perspective on their professional self by giving them the chance to explain some of their own background and biography. I sought to design the order to avoid leading them into a particular line of thinking in relation to the existing research. I thought it would make it less

likely that they would stick to a particular theme, or set of examples, if the questions were divided up and encouraged reflection across the full range of areas.

The sample

I wanted to be able to present a representative sample of the views of the senior leaders within one northern county, so I invited every secondary head teacher in the twenty one schools of the county to participate. This invitation was extended both by letter and a follow-up telephone call (the ethics application for the study is contained in appendix 3). Nine of the schools in the county chose to participate. Each of the schools that elected not to take part were heavily involved in other matters, such as, the conversion to an academy.

Burton, Brundrett and Jones (2014:95) comment that selecting the sample is a key part of any research, especially in the situation where there is no research funding and no clerical support. Punch (2009:250) identifies a wide range of literature around mathematically sophisticated quantitative research but acknowledges that this is becoming less relevant due to a trend towards education research (like this) which is qualitative, small scale and practitioner led. He reflects on the incidence of convenience sampling and cites the view of Miles&Huberman (1994) that quantitative research is often primarily people research. He advises that the sampling technique should reflect on the representativeness of the chosen method and the whether or not it uses probability or non-probability methods. Bell (1993:83) comments 'opportunity samples… are generally acceptable as long as the makeup of the sample is clearly stated and the limitations of such data are realised.'

I have chosen to restrict the overall sample to a particular county, partly on the basis of convenience sampling and partly because, as I identified in the literature review, there has been little investigation on this area in the North of England. As a result I am not claiming the results of this sample are generalizable across the country. Inside the overall sample, I have used purposive sampling to segment the overall population based on their identification as the most senior decision maker for ICT within the school, as the pilot showed that this narrowed population provided a tighter focus for the study. The purposive sample was open to all schools within the county as I felt this was a more appropriate method than either volunteer or snowball sampling, both of which may have been open to greater suggestion of interviewer bias. The choice of purposive sampling, given the nature of my research questions, would be supported by Punch (2009:252) as it gives the maximum chance of noting the relationships being investigated.

I believe that the seniority of the interviewees was always going to present a challenge to gathering a maximal sample. However, nine schools responded and this gave the viewpoints from about half of the schools within the county, which is a reasonable representative sample of the views of senior leaders from the county. Therefore, while a first impression may view a sample size of eight as being small, this type of contact for research purposes, isn't in my personal experience often given by schools. I have been able to use my professional links to gain access to either the head-teacher or relevant member of the senior leadership team which approves the spending and makes the policy decisions.

Each school nominated the respondent and I have included every school that participated except one. The school was excluded because sadly, I lost the ability to quote from the interview due to a

fault in the recording equipment. This lost recording should not be confused with the school that is included in the sample where the senior leader wasn't comfortable with being recorded.

In each of the interviews the local decision making[2] and the leadership processes within the schools were different, so there was no uniformity in relation to the job title of the person responsible for the spending. Faced with no uniformity of organisational structure, I asked each school or academy to nominate the person with whom I should speak and who was best placed to have an overview of the decisions that the school was making. In line with the background to decision making that I included in the first chapter, it should be noted that the decisions of these senior leaders are ultimately taken under the oversight of the whole of a management team who work with the governors. In each of the interviews, I have presented the views of the senior leader who was guiding and leading the process, or at least the person that was defined as having this responsibility by each of the participating schools/academies. I found that the nominated person always had a job description that included the leadership of ICT within the institution.

As I have explained in my section on the choice of a qualitative study, the research centres on the views of senior leaders about the effects of a contraction in public sector finance. The nature of this enquiry means that wider focus groups and data gathering of other empirical and qualitative data is not relevant to drawing out the motivations and experiences of those involved.

In the last section I have provided a little more context on the eight interviewees that gives an overview of their gender, experience etc.

[2] When I have used the term 'local decision making' I have not sought to impose any concept around this, but have allowed the interviewees to define that term in their own way.

Analysing and presenting my results

As I identified in the previous sub-section, there are issues with the sample around 'bias' and the 'extent of truth' claimed by the findings. Being an 'insider' brought some major disadvantages: firstly, some schools might have been less transparent about the nature of their decision making as they may have felt a degree of competition between my school and their own; secondly, the fact that I am working within the county and understand much of the political context, might have brought a degree of subjectivity and bias into the way that I have interpreted and discounted elements in the results that might have led me to wrong conclusions; thirdly, it was open to question whether I could be sufficiently self-critical and whether I could honestly critique thoughtful practices that I have developed, as I had a vested interest in proving the worthiness and value in my own actions. I have excluded my own school from the study for this reason.

I took an electronic recording of all interviews with the subjects (except one who objected to its use) and was able to transcribe these afterwards. I then transcribed each interview in full into a Word document and grouped all the responses around the three research questions derived from the literature.

After transcribing the interviews, I opted against the use of software such as NVivo (suggested in Burton, Brundrett and Jones (2014)) preferring the manual use of highlighter pens with transcripts spread across my desk to try to draw out themes which I coded with differing colours. The initial coding sought to break down the responses into those that related to each of the research questions; however, as Burton, Brundrett and Jones (2014:200) identify this often leads to focussed or refined coding. An example of the development of my coding is seen in the responses

that form Chapter 6, where the responses to the changes in funding were very different depending on whether the school was in an urban or rural setting. Punch (2009:173) identifies the use of this type of analytic induction when hypothesising on a qualitative data analysis and refers back to Hammersley and Atkinson(1995:234-5) who saw the rise of hypothetical explanations that are then reformulated when further phenomenon arise that do not fit the explanation. Instead of using Qualitative Data Analysis Software (QDAS) to aid with my coding of responses, I simply used highlighters to create the themes and then refined these onto several large sheets of A3 paper to triangulate ideas and visually create links between the responses. Having then broken down the responses across a set of themes I then summarised and conceptualised them. This memoing stage allowed me to move beyond describing the data, into a conceptual content that I have presented in Chapters 5 to 9. Burton, Brundrett and Jones (2014:202) support the use of this type of iterative analysis of non-linear information where it is broken down using pre-determined and then emergent coding and then using memoing that draws on a researcher's own professional knowledge by pointing to both Strauss and Corbin (1990) and Jones and Straker (2006).

As I analysed each, I took care not to misrepresent the language used by subjects. This danger of implicit bias applies not only to our understanding of facts, but the language that we use to convey that knowledge. At the end of the process, I have a set of findings. Throughout the process the thematic areas have evolved, both as a result of further reading and from the process of being supported by my research supervisor. My supervisor has challenged me to consider when themes were repetitious and when I drew a finding that was not adequately supported by the data I had presented. Care was needed about the way in which claims were extrapolated from the basis of the comments and in how I structured and represented the subjects' views. My research

supervisor, while not seeing the full transcripts, has improved both the validity and thoroughness of my processes. An important part of the future usefulness of this exploratory study depends on the ability of those involved to internalise and accommodate the practices of others. However, I believe that due to the seniority of those interviewed within their schools, they will cope with this challenge.

My aim is to ascertain whether a contraction in public sector finances has altered the view of the role of ICT within education for my group of schools and academies. The study has been broken down into three key questions: firstly, who makes the ICT spending decisions; secondly, what processes and priorities are used within that decision making; and thirdly, what wider political issues affect those decisions. The sixteen questions I asked in the interviews elucidated the answers to these three key questions.

Chapter 5 deals with the first key question around who makes the ICT spending decisions. Chapter 6 looks at the processes part of the second key question and Chapter 7 takes up the priorities aspect of the same question. One of these priorities, around the teaching of Computer Science, was separated from the others into Chapter 8, as it could be argued to be a direct product of wider political influence which would mean it was part of the third key question. Chapter 10 tackles this final key question and looks at political and economic influences. I show the links between the interview schedule, the key questions and the chapter in which the findings are presented in the following table.

Question from the Interview Schedule	Key Question in the research	Chapter
Q1	2a	Chapter 6
Q2	2a	Chapter 6
Q3	2a	Chapter 6
Q4	2a	Chapter 6
Q5	1	Chapter 5
Q6a and Q6b	3	Chapter 9
Q7	1	Chapter 5
Q8	2b (3)	Chapter 8
Q9a	2b	Chapter 7
Q9b	1	Chapter 5
Q10	2b	Chapter 7
Q11	2b	Chapter 7
Q12	2b	Chapter 7
Q13	2b (and 3)	Chapter 7
Q14	3	Chapter 9
Q15	3	Chapter 9
Q16	2a	Chapter 6

Figure 3 - Table of correlation between interview schedule and findings

Ethical considerations

Informed consent is important to all research. The sample was comprised solely of head teachers (or members of a senior leadership team) within the county. Head teachers have a real degree of institutional power and are more than capable of declining to participate. All schools were

informed of the aims of the research and made their own judgement about whether they wished to be involved. As the research is public, it was important for all parties to ensure that the results were not presented in a fashion that unduly posed harm or risk of unwanted exposure to any involved.

Short biographies of the interviewees

To help with contextualising the responses from my interviews I will provide a set of short biographies. My biographies balance the need for contextualised data with the desire to preserve the anonymity of my pseudonyms. A key aspect to preserving this has been not to name the county involved in the research.

The first interviewee was Philip[3], an assistant head, whose subject specialism was mathematics. As a member of a leadership team he was responsible for whole school ICT and managing the school timetable, alongside the line management of ICT, design technology and mathematics.

The second interviewee, Matthew, was one of the head teachers and his subject specialism was physical education. As a head teacher he had previous experience working on TVEI as an advisory teacher. He also had an assistant head teacher on his SLT who managed the ICT spend within the school and oversaw the technical team. He acknowledged that: 'I am not an expert in ICT, I have an IPad but probably only use about 15% of its capacity.' In a similar manner to several of the head teachers in my earlier pilot study, he drew some of his opinions about the place of ICT from

[3] All the names of the interviewees have been altered for ethical purposes as I discuss at the end of the chapter.

his family. ‘I am also aware of the power of technology from my own children’s experiences at home and I am also aware of the power of the quality that it gives to presentations and research and investigation and collaboration and that supports our agenda for teaching and learning and the skills that we are trying to engender.’ What was interesting in Matthew’s response is the way that he blended his personal experiences with those derived from the professional sphere and the work of his colleagues. This approach is seen in the comment, ‘I am not a Luddite by any means, but I am not an expert and I am open to advice.’ As an experienced head teacher, his response to advice was tempered with the wider collection of his life experiences. ‘It is one of those judgement things that you learn to trust your instincts.’

The third interviewee, Luke, was a head of school. The principal was often out of the school working on broader initiatives, leaving Luke in daily control. In his response to question five, he had added that, ‘I have always had responsibility for ICT’ and this sat alongside his other responsibilities of managing the school on a day to day basis. While he wasn’t trained as an ICT teacher, he could draw on a set of experiences outside the classroom that were relevant. ‘I had a career before teaching and that has always amused me when asked questions about your preparation for handling a budget. And at that time I was routinely handling work across the world with a budget of around £2.5million.’

The fourth interviewee, John, was also a head teacher and in his school he took responsibility for the oversight of ICT alongside his other roles. He had held his post for a number of years, and previously kept a fairly long term role as a deputy head in a different county. In a similar fashion to Matthew, he said ‘I wouldn’t claim to be an expert, I claim to be a user and the technology is

moving fast and I am struggling to keep up.' Also he added 'I suppose like a lot of us, my knowledge of IT is broadly self-taught. I am not so sure that this works as well now as it did and we are struggling to keep up with the pupils.' He had gathered, like Matthew, an instinct that ICT was important to classroom practice. 'I was in the days when computers were first coming in, and I saw that computers were the future, and that was the technology that pupils needed to feel comfortable with.'

The fifth interviewee, Jean, was a deputy head teacher at the school and had responsibility for ICT within the school. She was supported with this aspect of her role by a network manager and a head of ICT, as she did not have a background in the teaching of ICT. Jean had taught at the school for a number of years and had an established place within, and understanding of, the organisation. She had worked her way into her current role by proving her abilities on the curriculum side of the school. In her role, she had managed a learning resource centre and had been responsible for introducing a new ICT structure. She felt her experiences, including those as a staff governor, had given her a good understanding of the global perspective of the school and an ability to prioritise competing needs.

The sixth interviewee, Emily, was not a teacher and held the role of the school business manager. She was the member of the SLT who managed the ICT budget, developments within the school and line managed the technical team who delivered those projects. She had prior experience working for the Health and Safety Executive and had moved from a senior industrial position that involved managing inspectors, into the school environment.

The seventh interviewee, Peter, was an assistant head teacher who had responsibility for the ICT development within the school alongside a wider role about global community and partnerships. He had moved into the area of ICT following an earlier responsibility for the management of the specialist school status for technology and the expressive arts. He felt that, 'My experience of financial management came through developing budgets in the specialist school dynamic' and that 'I was told that I was relatively good at devising budgets.' While he had been to a couple of 'superficial' courses on financial planning, he felt that he had 'no formal training' and that his skill was the ability to take 'a more strategic perspective on teaching and learning and curriculum.'

The eighth interviewee, James, was not a teacher. He was the only ICT trained interviewee in any of the surveys and his role within the school was as part of the SLT. His type of post existed in most of the schools that are in the study but the person in that role tended to answer to the member of the SLT who was being interviewed. Prior to working for the school he had managed a call centre with a team of five programmers, working for large corporate clients, such as Coca Cola. He felt that 'from day one I decided that I wanted to bring the industry standards and expertise into the school.' He held a fairly clear view of how he wanted to develop and standardise the ICT infrastructure. These initiatives were being used by the school in relation to teaching and learning. 'I always work to a strategic vision and a roadmap and that was what I intended to bring in and it has happened. The reward of my being here is that 50% of the school improvement plan for next year is my strategy document and this shows how heavily ICT is now embedded within the school.'

Generalisability, Validity and Trustworthiness

Burton, Brundrett and Jones (2014:206) comment that traditional research takes validity, reliability and generalisability as key criteria for judging quality. Both reliability and generalisability are 'difficult, if not impossible' in small scale qualitative investigations. I have explained that, although I could argue that my use of a single county should be viewed as a cluster sample, it was really an opportunity or convenience sample with a purposive sampling method. The sampling choices have not been designed to allow me to claim a broad and reliable evidence base; this research does not claim to have any 'truth' beyond that of its sample. I may feel that the views expressed have been gathered across the county and could be fairly thought of as being able to be generalised to be representative of that population, but it would require further research to show the degree of consistency with which they could be extended to other counties. Burton, Brundrett and Jones indicate that we need to accept that 'practitioner research is typically provoked through teachers' identification of a problem/issue, which warrants systematic enquiry' but that 'it has to defend itself against claims of subjectivity'(2014:207). They encourage the reader to assess validity by reflecting on the extent to which the findings relate to the research questions. I assert that internal validity is to be found in the way that the data has been conceptualised to answer the research questions and the logic and consistency of the arguments that are presented. Punch (2009:315) cites Denzin and Lincoln (1994:114) who argue for validity based on the way in which the findings faithfully represent and reflect the reality that has been studied. The trustworthiness of the research be assessed by considering the methods that I have selected and the care with which they have been applied.

Summary

In the first chapter, I reflected on how ideology shapes our choices and this idea was expanded by a second chapter looking at the interplay between political ideologies and policy making. In the third chapter, I sought to show how the ideological debates in the political sphere had been reflected in the different positions within the academic and research community. I have just covered the debates around evidence and the style of my research. My purpose is to ascertain whether a contraction in public sector finance has altered the view of ICT for those within my study. In the first chapter, I identified three key questions, the first on who makes the spending decision and this is covered in Chapter 5. The second on what processes and priorities are involved are drawn out over Chapter 6, 7 and 8. I then pick out my final key question about wider political issues in Chapter 9.

Chapter 5 - The decision makers

Introduction

The study examines whether a contraction in public sector finance has altered the view of the role of ICT from the perspective of my interviewees. In the first section of Chapter One, I looked at the broad structure of schools and how the governance structures work. In this chapter I consider the first of the sub-themes which were identified in Chapter One; namely, who makes the ICT spending decisions in those schools. I intend to do this in three areas and present the findings: Firstly, I investigate whether the majority of the decision are made at the strategic level by a member of the school leadership team, or if it is delegated to a member of middle management (tactical), or whether the senior leader feels that the decision is made elsewhere. Secondly, I identify the level of training or qualification this decision-maker has and then thirdly, how they are able to consider the full range of factors around the cost of ownership.

In the post-New Labour post-BECTA environment, money for technology is not prescribed in ring-fenced pots, but instead the local decision counts. Greater freedom of choice at a school level has led to unease in parts of the industry and advisory sector about fragmentation and incoherence. SecEd, in a recent report on an educational symposium into ICT and the future of education, observe Ray Barker (director of BESA) commenting on the absence of a ministerial post for ICT in the Department for Education. Ms Forster (Head of school programmes at e-skills UK) added that 'Technology is a big issue but we are a fragmented profession with a fragmented role and the

ability to create a coherent voice and coherent debate about pedagogy is getting harder' (SecEd, 2012:DT2)

In this chapter, I show that my interviewees think that decisions are made locally, but those ideas are often modified by the constantly changing demands of policymakers. Some of the BECTA research supported this idea of a widespread use of a reactive planning process that varies depending on the individual schools. Scrimshaw (2004) places school leadership at the heart of enabling innovative ICT practice, alongside strong planning. Condie et al. (2006) highlight the importance of a school level e-strategy in future development and sustainability, while OFSTED (2005) identified that few schools have a strategic plan and that the planning often lacks coherence.

The responses presented in this chapter will show that the technology overhead continues to expand in the schools of those interviewed. Yet, we are living in a period where the government is not trying to dictate to schools with the risk that future planning is fragmented and individualised. Policy making has moved from being centralised to being localised and this means that it could easily become incoherent and confused. There are many vested interests from commercial companies to ideological policy makers but, the empirical evidence of classroom impact remains inconclusive. How will the education profession adapt to the new climate and has digital technology in school policy making had its heyday? I will explore the commitment of my eight interviewees to spending money in this area and what they perceive are the challenges and how they are adapting to them.

BECTA (2006) and OFSTED (2005) noted that there was an issue with a lack of formal training in the leadership of this area in many schools. In the responses, Matthew says, 'I wouldn't claim to be an expert, I claim to be a user and the technology is moving fast and I am struggling to keep up.' He adds 'I suppose like a lot of us, my knowledge of IT is broadly self-taught.' The danger inherent in this is that systems are implemented with a strategy that fails to consider fully factors around the TCO. An underdeveloped appreciation of TCO can lead to important areas, such as training or alternative implementation strategies, being overlooked which affect the success of an investment. Under New Labour's centralisation policy, BECTA argued that there was a lack of a robust purchasing procedure that was based on quantifiable data. BECTA attributed the variation in the thinking on Total Cost of Ownership (TCO) to the range of perception in the success of ICT spending.

Tactical or Strategic management

As I sought to show in the first chapter, it is unfair to assume that most internal spending and processes are determined directly by the head teacher, as this depends heavily on the internal structure the school. Some BECTA research would point to the fact that the more stakeholders that are involved in the process, then the stronger those decisions become. Scrimshaw

comments,

> ‘A whole school approach to access to and sharing of resources appears to be preferable. Appropriate resourcing and flexible, forward-looking planning, linked closely to what teachers actually want and need at any given stage, will be essential.’ (2004:5)

I asked each of my interviewees ‘How do you plan your spending on ICT within the school and who is involved in the process?’ The purpose was to determine the perception of the interviewees of their role in the process and that played by other members of the school, or other stakeholders. Philip felt that the key participants in the decision making process were himself and the ‘finance lady’ with whom he worked closely to ensure that the right amount of money was allocated. Once the funding stream had been resolved the key participant in supporting the decision was the network manager and this process was approved by consultation with faculty leaders and an ICT steering group. Interestingly, at no point in the discussion of the process did Philip mention either the head teacher or the rest of SLT, but perhaps this was implicit in the response.

Matthew was a head teacher, but drew support from a member of his senior team who had a role as the director of e-learning. The director created a development plan for approval by the whole leadership team. Part of her role as a senior leader was to cost, advise and evaluate this plan. Throughout his responses Matthew referred to using his senior team for advice and to support

decisions with internal action research (which they published). The other point of reference was the governing body who were involved throughout the processes and approved the decisions.

Luke was the head of school and the structure surrounding his decisions on ICT followed another model. He made the initial decision in conjunction with the network manager and the senior business manager. This core team would determine the set of local priorities by setting the needs of the establishment against the available funding. The decisions of this team would then gain approval from the governing body. Luke spoke candidly about the alternatives for discussing funds with the governing body, either by directly approaching the finance committee, or by following an initiative through the teaching and learning committee and then on to full governors. Throughout this process, Luke felt that he was making the decision about how much money and where it should be spent. He was grateful for the advice and support of the two managers and also the head teacher (principal).

John, as a head teacher, made it clear in his response that the decision making for ICT was ultimately by him. His decisions sometimes involved working with the middle management of the school, and at other times was being driven by him in conjunction with his senior team and the governing body. His response to this question presented a leadership style that was quite democratic in its approach, but in other questions the response indicated that this style could alter to one that was either pacesetting or coaching. This model was similar to that followed by Luke and Matthew.

Jean's decisions began with the priorities determined within the leadership team on the school improvement plan. This was then adapted by an ICT strategy group, which consisted of an assistant head, the business manager, the network manager, the head of ICT curriculum, the head of business curriculum and another head of a curriculum team, into a second three year plan. The decisions of this committee were then shared with other curricular teams and updated on an annual basis. It was also apparent that at times Jean and the leadership team would also directly implement changes. An example of direct change was a move to provide remote access or online reports that were not part of the regular scheduled priorities. This presents a model of local decision making driven by the needs of the school, with a process that was designed to involve a greater participation by the middle management than was shown in many of the other respondent schools.

Emily made the decision about what money should be spent on ICT, although the mechanics of the decision were split between a senior ICT manager, who took a whole school view and monitored the priorities within the requests, and a head of ICT/e-Learning, who made a set of curriculum requests. When they decided what spending was viable, this was presented to and approved by the head teacher and then it went on to the governing body. It is a model similar to that employed at Philip's school, but it didn't have an assistant head involved in the decisions with the finance team.

Peter felt responsible for the decision making within his school, although this was as a part of the leadership team. Initially the decisions had been taken in a democratic fashion by a large SLICT (Strategic Leadership in ICT) team which he had chaired, but they abandoned this model in favour

of a more direct approach between middle and senior leaders. Describing the demise of SLICT he said, 'It quickly became apparent that this became like a rudderless ship so now we take an approach that is more bespoke.' The middle management presented a plan, with impacts, outcomes and a rationale that was centred in teaching and learning. Now the SLT were much more involved in the process, 'Once I have constructed the proposal it goes to the leadership group, and we all sit down and I present it to the leadership group and explain it and we either approve or disapprove it.' This is a more centralised model of decision making that has many aspects in common with the one followed by Jean.

The approach adopted by James was very similar to that followed by Matthew. James determined the required spending by taking advice from curriculum leaders and technical support staff. He prepared a set of proposals based on his own view of the needs of the school and this was then examined and amended in a discussion with the rest of the leadership team. The funding for the decision then went from the leadership team to the governing body.

In each of the schools in this study, there was a member of the senior team who had direct responsibility for ICT. This was usually linked with a portfolio of other roles within the organisation and only James had a role that was solely linked to ICT. In James' case, the leadership of ICT was the sole responsibility of a member of the leadership team and would, therefore, compare with responsibility for the pastoral system or the curriculum.

Butt and Cebulla (2006) drawing on a nationally representative sample of schools in England to analyse the relationship between school outcomes and indicators of e-maturity. They could show

a rise with both primary and secondary schools in their e-maturity between 2002 and 2005. However, they noted that the increase in the overall e-maturity rating in 2005 was associated with resource upgrades and the increased classroom use of these resources. They did not see an association with teachers' and schools' own ability to use and manage these resources (2006:38). It would appear that now, schools are responding to the significant and on-going level of spending on ICT and are giving an oversight of the process to someone with a 'board level' position within the school. This shift would parallel that which is seen in other industries that have adopted ICT: where at first the responsibility is delegated down the organisation and, as it becomes increasingly important to the mission and function, this is then reflected in its leadership structure.

The shift of ICT infrastructural planning and oversight into the job responsibilities of a member of the senior leadership team reflects a change in thinking within schools over the past few years. The schools in the study would appear to see ICT as a strategically important part of their effective functioning and the leadership role also shows a growing recognition of the amount of funding that ICT takes from the typical school budget. It would seem that a senior leader running the ICT strategy is important not only for strategic, but also for pedagogical reasons. The change is not simply an administrative one but involves building the vision for its use and incorporating thinking about it into wider school planning which should ensure that purchasing has a strategic objective. There is also the danger (cf. Fullan, 2014) that the leaders try to micromanage the activity within the classroom rather than establish the right atmosphere for teaching creativity and experimentation.

The responses have shown that the most common approach was for a single member of the leadership team to create the plan and then gain approval for this from the remainder of the leadership team before it went to governors for a second stage of agreement. This model was followed by Philip, Luke, John, Emily, James and to a more limited extent, Matthew. However, Jean and Peter took their decisions in a more communal fashion with plans that were adapted in committee and then reported back to the leadership team, rather than being strongly led by a single individual. The danger here is that collegial approach doesn't build the relationships and collaboration that is important (Fullan, 2014; Selwyn, 2011)

In Philip's school the priority structure began by looking at the infrastructure, followed by a rolling programme of replacement that had been determined at the centre, and went on to consider the needs of the various faculties. He said,

> 'we look at the server and things like the wireless system, where we check it is up to date and whether we can keep it running properly at the right speed. We look at the rolling programme and see what is coming to the end of its useful life and look at replacement and then on top of that I will have a discussion with the faculty leaders to discuss with them what requirements they have got.'

In this approach, Philip was making the decisions on behalf of the whole school and acting as the arbitrator between the competing priorities. He gathered an awareness of the demands of the whole school by discussion with the faculty leaders and also an ICT steering group, 'where we discuss things, it is made up of the network manager, myself and also a representative of the ICT department itself.'

In the last year, Philip's model had led to spending being divided roughly between the purchase of servers and infrastructure on the one hand, and new desktop machines 'to replace kit' on the other. Philip had already noted that at that moment 'what we are trying to do is to keep the current system up to date rather than continually adding more to it'. It was an approach that was not designed to be creative and developmental, but was aimed at being robust, sustainable and fiscally restrained. It was no surprise that when asked directly about whether the spending was aimed at keeping the system going or developing new initiatives, he saw the priorities as maintaining the existing hardware overheads. 'The majority is going on replacing the existing infrastructure itself and I don't really want to add to that – we can barely afford to keep it running as it is without expanding it.' At the same time as being conservative with the hardware overheads, Philip was taking a critical look at the ongoing software overheads.

Matthew had a vision for ICT within the school and he had been able to devote funding to attain this end. At his school, the director of e-learning oversaw the whole school development plan and had a leadership role in, 'horizon scanning and advising us on our next move and she is also responsible for evaluating measures and abandoning things that haven't worked and making sure that we are getting value for money and are seeing some impact.' Matthew's support for ICT and its potential within his school had a real quantitative impact on outcomes. The leadership of ICT was embedded in the senior leadership structure and was supported by tactical leaders on both the curriculum and network side of the school. The decision making for ICT was not focused solely on the potential for the hardware, but also in recruitment and retention of the best teaching staff. There was an emphasis in the decision making on the need to train staff and introduce technology

in a sustainable fashion. 'It is that need to recruit staff and to maintain a high quality and professional development environment.' The introduction of a new piece of technology into the school was supported with a robust mechanism of action research projects which were then published on the website. The school exhibited a thoughtful decision making process that focused on a range of short and long term goals. It achieved the goal of iPads, 'after 3 years of investment', so that they then felt that the security and reach of the system were in the right place, but the goal 'has always been to have a mobile technology that is available to the kids.' When I visited the place was in the midst of a building programme designed to improve the nature of the teaching space available to them. The institution exhibited the full range of the factors that were identified by Crook (2010) as being important in planning ICT spending. An emphasis in Matthew's response, missing in many of the other interviews, was a readiness to acknowledge when a development had not worked and to scrap off a piece of technology and move on: this acceptance and openness about failures demonstrated a robust process of evaluation.

At Luke's school, the emphasis in the decision making was a blend of both Philip's and Matthew's. The school had a real focus on development and introducing a range of new technologies, while at the same time it was looking for ways to reduce the costs of its overheads and make the technology more sustainable. Luke commented that they had found, 'ICT used to be expensive' and they were now making decisions around virtualisation that would bring down the medium and long term costs of upkeep. The leadership of the school set the priorities and within that system it created a three year programme for ICT development. The implementation of the vision was done by Luke (as head of school), the network manager and the senior business manager.

This system worked in the same way that it did with Philip, where the school priorities were set by a leadership team that took the broad perspective, and then the detail in relation to a particular area was worked out by a leader charged with oversight of that aspect of the school. Within the implementation of the plan there was room for innovation on top of maintaining the existing infrastructural requirements. After commenting on those involved, Luke said we

> 'sit down and think about what we would like to do now, what we would like to do in the future and how much it is going to cost with some ballpark costs. We then ask which can be done in the normal spend, and what falls under the umbrella of a special project. The funding from there starts with us going back to the governors' finance committee.'

Luke felt that ICT had an important part in where the school was going and that this was supported by the principal. Together with the principal, he was astute in being able to find the funding and support from the governors that allowed them to translate their vision into a sustained reality.

John's approach appeared to mirror the pattern of both Luke and Philip, in that the funds were tightly controlled from the centre by a single leader.

> 'Sometimes, I give heads of departments a budget that they bid for, and which links to the school development plan, and if it is good enough then they get the funding. At other times we have driven it as a senior team... we say that is the technology we want to do.'

When I probed the autonomy of curriculum leaders to innovate in their own areas then the

response changed to, ‘sometimes we drive it and sometimes staff drive it.’ John then talked about the importance of listening to the staff team and if they made a sufficiently strong case then providing the appropriate funding. On balance, I felt that the approach was most similar to that adopted by Luke, in that the school established a development plan and then allowed departments to bid for innovations that were approved at the centre, based on the strength of the bid. I think the difference between this process and that adopted by Philip was the focus on development.

James, in a similar way to Philip, looked on his budget as having two levels. The first level was to be able to manage the hardware and software commitments that were already within the school. He termed this ‘the core level’ which he defined as ‘a given amount of money to keep the school ticking over’ and this sum was determined by him on a yearly basis with the head teacher. The second level was a developmental process where the technical team reported back on the needs of the various curriculum areas. The technical team had been divided up so that they each had a link to specific areas of the school. The consequent proposals were then assessed by James based on his perception of what the school needed and the resulting plan was discussed at leadership team.

The model for decision making, in each of these institutions, was very dependent on the research conducted by the other leaders into the changes that they had in mind. It also depended heavily on their ability to interpret the preparedness of the organisation for any particular change.

Emily's style of decision making differed from the previous more centralised styles (with the exception of Matthew's, where there was some similarity), in that she didn't collate the bids and determine which would be successful. Instead, a senior ICT manager prepared a plan for her and set the priorities within the spending. The senior ICT manager was responsible for liaising with the curriculum team and he compiled the budget plan. Emily's role in the process was then to review the decisions that had been taken. This was not simply a process of rubber stamping, but in collaboration with others on the senior team they would approve the bid, and 'it might get a bit knocked off, or something might be identified as a higher priority than what I had it.'

The style of decision making being described by Jean was altogether more collaborative.

> 'The process starts with the school improvement plan which contains within it a set of priorities. We have an ICT strategy group, comprising of an assistant head teacher, the school business manager, the network manager, the head of ICT curriculum, the head of business and another head of a curriculum team. This group of people drives the strategy and implement the change as and when changes are introduced.'

This strategic group contained most of the people that were referred to in the decision making of the earlier interviewees, but unlike them it was not to be approved finally at SLT following a set of bids and a filtering process by a single leader. Instead, they saw the function of SLT as setting the direction and then they devolved the decision making power over the ICT budget to the committee. In the other schools that referred to a strategic leadership group, this body formed more of a consultative and supportive role for the leader who made the decision, rather than

being the actual decision making body. There would have been value in an interview with the assistant head teacher on the strategic group at Jean's school to ascertain their views of the effectiveness of this approach. Peter followed an identical model to Jean and built a SLICT team which he chaired. The committee structure determined by Peter was significantly larger than that of Jean, increasing exponentially the potential power relationships at play. Peter had moved from the approach of decision making by committee, to one similar to the others where each of the curriculum teams submitted a development plan that was then reviewed by himself, along with the head and business manager.

This leads me to the finding that the management of whole school ICT was a senior leadership role and controlling spending in this area is seen as a strategic role. Fullan (2014) stresses the importance of the principal in raising standards and using technology within schools. He views the principal as being capable of managing the complex mix of human, social, financial and technological capital involved in the process, and maximising the conversation around both teacher and student learning. However, Fullan interacting with Cuban acknowledges a danger in having a principal whose time is being eaten up by pursuing streams of funding or managing the 'retrofitting' of gifts from the state (2014:36). Technology could easily absorb too much time in trying to juggle ill-shaped and uncoordinated policies. Fullan sees the essence of being a successful leader of technology change, as centring in the ability to look outside the school, engage staff and students in a vision, embrace a willingness to see what works and establish parameters about what is acceptable or not (2014:149).

Hollingsworth (2008) conducted a study of 181 out of the 356 schools removed from the bottom two OFSTED categories in 2006-07 and looked at the role of ICT in the schools development. He

noted that 82 per cent of the head-teachers in the study believed that ICT played a key role in their improvement. He noted that:

> 'over half of schools had appointed a new head-teacher since September 2005. Visits to schools identified a senior leadership team with a personal interest in and commitment to ICT.' (Hollingsworth, 2008:5)

He also found that 75 per cent of primary schools and 72 per cent of secondary schools had a written policy in relation to ICT. The Primary schools with a written strategy showed significantly higher attainment than those with an unwritten or no strategy Hollingsworth (2008:17).

The majority of the interviewees operated a system that was dependent on the leadership of a single individual, who oversaw ICT within the school, to determine the priorities and how to proceed in the forthcoming year. This type of model places a significant amount of expenditure in the hands of one person. Perhaps this was a factor in ensuring the movement of that individual onto the leadership team in each of the institutions. The sum of money involved in ICT purchases mean that it requires a strategic view on the direction and needs of the school over the medium and long term. It also needs an operator who can balance the competing demands of the differing curriculum areas and weigh the cases being presented rather than bend to personalities. The schools whose ICT strategy was being led by the head teacher seemed to have a clearer vision and a more established pedagogy for its use (cf. Fullan, 2014).

The level of formal training

In the SecEd (2012) report Paul Ainsworth, who is vice-principal of Belvoir High School in Leicestershire, followed up on a suggestion that 'schools should appoint a member of the senior leadership team with specific ICT knowledge and expertise to talk to providers.' He commented that, 'his team had chosen someone who had worked in the industry and could speak their language.' After explaining about his school's ICT strategy group he said, 'the school trusts in our ability to make these decisions.' SecEd (2012:DT1)

Seven of the eight leaders interviewed didn't have formal or academic qualifications in ICT and their understanding of the issues were largely self-taught or process driven. A HayGroup report speaks of the importance of harnessing technology within any organisation. It reflects on its ability to allow institutions to innovate and develop concluding,

> 'Helping to counter doubts about these new technologies, the acceptance of which will determine the success or failure of innovations and new products, is crucial. Leaders may not be experts themselves, but they must know enough to keep projects focused and to hold the ring between the competing views of different team members. In so doing, they will have to work through informal influence across functional and organisational boundaries.' (HayGroup, 2012:10)

Three of the senior leaders were head teachers, and took a direct responsibility for the leadership of ICT as they saw its potential in whole school change (Fullan, 2014). However, the fact that all those interviewed sat on the leadership team would suggest that schools have developed from the position that forced OFSTED (2005) to comment about the absence of strategic planning for

ICT in many schools. Condie (2006) pointed to the importance of a school level e-strategy in creating a procurement process that was sustainable.

This leads me to the finding that the majority of the leadership of ICT was undertaken by non-specialists. Guha (2000) shows the rise in expectation by pupils for teachers to be knowledgeable about computer usage. Bosley and Moon (2003) point to the wide inconsistencies in ICT training received by teaching staff. This is developed by Russell and Bradley (1997) who discuss the anxiety felt by teachers in relation to the use of ICT. SecEd (2012) cite Rebecca Darch, who did a PGCE in 2009, as saying that she received some ICT training, but not enough. The formal training on Darch's course was around actions, like adding a contact in Outlook, and she thought that there was a wide variety in teacher competence in using ICT. The same SecEd report quotes Ben Greene, 'The ICT training that you get on a PGCE is probably beneath students' capabilities, but it's probably what a head of department needs.' BECTA (2006) identify the need for more formal training for ICT within schools and I would suggest that in addition to NOF style training of teachers, there also needs to be a structured leadership training programme around the purchasing and deployment of ICT. It is questionable whether an untrained leader could function as effectively as a trained one and this would be an avenue for further research. Fullan wrapped in Edutopian indignation writes,

> 'Technology has dramatically affected virtually every sector in society that you can think of except education. It is shocking to have to say that, Learning, surely the most important human resource in the world, is not benefitting from the greatest technological resource on the planet.' (2013:72)

The findings of Fabry and Higgs (1997) pointed to the fear of loss of professional status amongst

teachers and the downgrading of pedagogical skills. However, Selwyn (2014) would suggest that the real issue for distrust is an incoherent or inappropriate vision. Training in building a vision for ICT and deploying resources could form part of a future development in leadership training. The schools in this study that gave me the strongest impression of having a fully embedded and integrated vision for the role of ICT in teaching and learning usually had a head teacher with responsibility over the area. I have already commented on the real quantitative impact of Matthew's leadership and this was also evident with Luke and to an extent John. The oversight at a senior managerial level should help to prevent ICT being used to reduce teachers' confidence and instead help to focus on its use as a tool where it is appropriate for pedagogical reasons.

Luke, Matthew and James were all fairly confident despite differences in their experiences and their planning tended to be fairly proactive. Philip and John were slightly less comfortable with John acknowledging 'I am struggling to keep up' and Emily, Jean and Peter were probably the least secure in their own grasp of the potential of ICT and relied more heavily on their leadership ability. On this basis, there seems to be a link between the extent to which a senior leader felt confident in their own grasp of the capabilities of ICT and the extent to which the planning was forward looking and developmental (cf. Fullan, 2014). The link between training, planning and purchasing is important. The purchasing process in schools is an important side to the decision making process. It was a frustration highlighted by James, where the school he had joined didn't have a robust procurement policy and decisions were often being made without adequate research, or were swayed by a strong sales pitch. BECTA (2006) commented on the importance of school leaders that followed a robust approach in examining the TCO (total cost of ownership) for

a piece of technology. While for Crook (2010) the important factors in planning spending were leadership, a learning platform, staff development, and the provision of versatile learning spaces.

Considering the total cost of ownership (TCO)

BECTA (2006) reported on the role of school leaders in collating and managing costs and suggested a range of ways in which to develop and embed the use of ICT in schools. This report encouraged school leaders to look at the total costs of ownership (TCO), remarking

> 'to gain a better understanding of this, leaders can measure constituent ICT costs and the proportion of total ICT budgets they typically command. Constituent ICT costs would be: user self-support, formal support, training, consumables, network, hardware and software. With this detailed cost information, leaders can more easily allocate appropriate funding and sustain their school's ICT development.' (2006:2)

Interestingly, the report sets the annual TCO of ICT for the secondary schools involved in the survey at £270,000. It also comments that the total costs per PC varied greatly from school to school and that equipment and hardware costs usually accounted for 25% of the total budget. Equally, schools with similar numbers of pupils could have widely different TCO totals, partly due to different levels of ICT provision and local circumstances. The differences in expenditure could also indicate the role of the processes that are followed within the school, to determine whether those can affect the expenditure.

Butt and Cebulla (2006) comment that e-maturity is an important part of school improvement and is often linked to contextual factors such as school ethos and leadership styles. BECTA (2006b) identifies nine factors in creating a sustainable ICT strategy. These range from auditing the existing infrastructure provision, equipment age and costs to identifying the impact of existing provision and practices on staff (and possibly pupil) satisfaction, confidence and competence. This policy research is echoing some of the research from Fullan and the Microsoft PIL network that was covered in the earlier section on the 'Edutopian pedagogical narrative'. They perceive a need to review procurement practice and value-for-money processes by introducing a rolling three-year whole school budget, which includes a realistic proportion allocated to ICT-related costs, based on the development plan.

There were a wide variety of responses and processes evidenced when considering what ICT investments should be made. The ninth question, which is included in the research schedule in the appendix, was 'What factors do you consider when looking at the cost of a piece of software or equipment for a member of staff.' It was designed to draw out the depth of thinking behind the TCO of a piece of software.

An ideal response from the BECTA (2006, 2006b) research would show a perception of how to encourage self-support teachers and a set of formal support and training from the school. In the previous section we noticed the absence of formal training amongst the interviewees and the literature suggests this could affect their ability to appreciate the TCO for software, although given the width of practical experience, some of the leaders will have learnt skills on the job. A lack of training could also show in the understanding of the nature of the consumables required

by the change and its effect on the network. Crook (2010) stressed the importance of thinking about staff development and the versatility of the learning spaces. The space was important to James who had a clear view about what worked within the classroom. While some may think that half classrooms of computers would create a versatile environment, he said 'there is no point in having a half suite of computers. It doesn't work, it's stupid.' James wanted versatile spaces that worked. He gave another example of Science wanting an ICT suite which had been approved, 'we got the ok to convert a lab to a semi-ICT suite and had it re-cabled and filled it full with laptops. In two or three months all the laptops were wrecked and we pulled it all back out again and it was a complete waste of time.' The change had been begun by the middle management in the Science team and not been part of a broader development that looked at the needs of the team and their ability to integrate and manage the equipment. James had been asked to amend his vision to support the development and due to its unplanned nature and the failure of the non-technical sides of the installation it had failed. The clarity and the width of the thinking around what worked, and why it worked was an important part of the decision making for James. In this example, there would appear to be a failure in creating the shared vision in the first place. Mumtaz (2002) discussed the nature of the space as an important issue in determining success and viewed it as being potentially more important than the quantity of the equipment available.

All these factors carry a financial cost that is in addition to that of the hardware and software involved. As well as keeping an eye on the TCO, BECTA encouraged schools to examine how technologies impacted across the institution as they noted the rise of e-registration and a plethora of other systems. Various studies highlighted the importance of technical support and the appropriateness of a learning platform. These issues have been considered separately, as they

came up within the study. The factors that form part of the decision making are an important indicator of the robustness of the procurement process and whether or not it takes account of the needs and applications across the whole institution.

Essentially Philip's response focused on controlling the costs of the hardware and software rather than any wider issues. He was primarily concerned with the impact of the spending decisions across the school and was looking for a purchasing option that benefited more than one subject discipline. This multi-purpose purchasing was not something that was rigidly applied as he also reflected 'do we want that type of facility made available to students' and similar considerations provided the justification for specialist equipment, like a language lab. Additionally, Philip was focused on good value from his software purchasing where he was weighing up cheaper alternatives, such as Serif, and more expensive solutions like Moviemaker Plus. There was an issue with training around ICT evidenced when, in response to the later question on the VLE, he commented, 'the start is getting the staff to use it – we haven't had enough training and this is always an issue with anything in school – the training is particularly hard.' At the same time the focus on multi-purpose environments indicated an approach to decision making that looked for versatile and useable spaces which a significant body of the literature suggests is an important factor in future success.

Luke, like Philip, centred on value for money and commented that 'most often staff would feel they get value for money, and most of it comes on things they never see like the virtualisation or the money that we have spent on making the network more robust.' Luke's point is that when an installation is well managed and has been properly integrated into the thinking of the

organisation then it tends not to be even noticed. He is drawing attention to the fact that an efficient method in TCO terms isn't necessarily obvious in the machines that are visible in classrooms. His focus was on the quality of the teacher experience and this more cautious approach meant he was less concerned about versatile learning spaces with the Edutopian peer learning ideas they embody. However, the school had a focus on developing some of these ideas. In the response to question 13 he commented, 'Our key priority next year is independent learning. Instead of INSET days we run Twilight sessions and independent learning will be the focus along with ICT.'

Jean's response focused on whether the technology was fit for purpose and then on the projected lifespan for the technology. A factor she highlighted that was not mentioned by the others, but was implicit with some of them, was 'we also have to decide what the maintenance is going to be?' She illustrated this with the example of digital projectors which have a notorious high ongoing cost in many schools.

Peter was quite candid in his response and indicated that the procurement processes might not have been very robust in previous years. He said, 'some staff go on a course, see a piece of software and think we have to have that, and then it goes in the cupboard and stays there.' He added, 'We have had staff in the past who bought hardware and software on a whim, because they thought it was a good idea, and it wasn't particularly student friendly.' Their current approach was designed to prevent a repetition of this type of procurement. One of the key factors he had identified was the ability of staff to deliver with the technology, or as he put it 'you have to take the personalities into consideration.' When he was examining a piece of technology, he

looked at its compatibility, whether it was industry standard and how it would be used in teaching and learning. At the same time, he queried the use of tablet technology as a means of introducing versatility into their teaching environment. The school had recently experienced a significant change to the buildings and when this was being planned Peter had visited the Djangoly academy in Nottingham. At Djangoly he saw their use of tablets and a wireless cloud and thought it represented a way forward. When the plans for the new building had a 50% cut they abandoned the versatility of tablets. Peter reflecting on this said, 'It was a step too far for us at the time and in the end I am glad that we didn't go there. I still see the potential of tablet technology, although I am glad that we didn't go down that route at the time.' Peter's focus in his wider responses, as they are relevant to this finding, were around a clarity of vision in making an impact on students' performance and the place of technology in teaching and learning. He didn't centre in any of his responses on the development of the staff.

John didn't interpret the question in quite the way that I anticipated but spoke about how the leadership team would monitor the effect of an investment through observation. However, this reflected on a wider trend in his answers where the focus of much of the introduction of technology was around evidence for a practical effect in the classroom.

James, drawing on his previous training and experience, showed a clarity of vision when considering factors around the TCO. His initial response was to look at the cost of the hardware and software involved and then to set this against where and how it was going to be used. In assessing its use he considered the capacity of the staff to deliver the change predicted with that development. He also questioned whether the solution came with training or whether this was

something that would need to be purchased separately. After this fairly robust set of questioning on the proposal, he then looked for the research around the use of the product in other schools. If the technology sat on the 'bleeding edge' (innovators) or even the 'leading edge' (early adopters) then he would ask further questions and propose a trial to assess viability. The terms are illustrated in this adoption cycle,

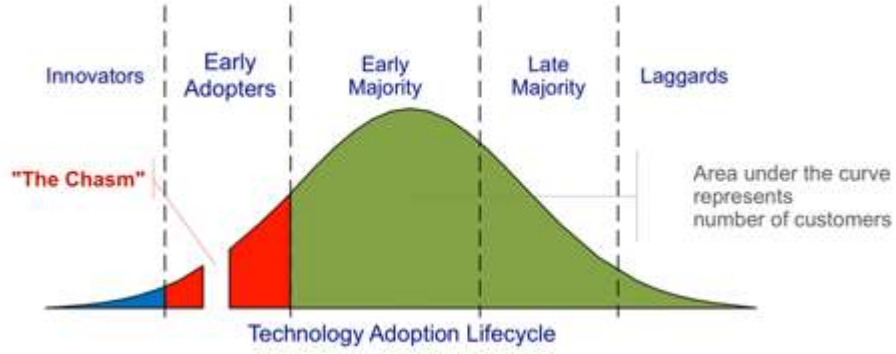

Figure 4 - Technology adoption lifecycle (Peterson, 2010)

James employed a fairly robust process around the assessment of products with his own internal procedures. He spoke about the research that he would do on a proposal and talking to others. 'So many times in education we re-invent the wheel and everyone is doing the same thing.' One of the places that he would use for this research was Edugeek. This website acted as a tool to help him access a wider sphere of professional knowledge and experience.

Matthew's establishment were using mobile devices, such as iPods and iPads, to improve the versatility of the technology. 'Last year, the first step of that was iPods on a bookable basis and that has been evaluated and seemed to have an impact and so we are now at the next stage where we are looking at further use of mobile and handheld technology.' His schools' vision for

ICT showed a focus on versatile and attractive teaching spaces, but there was an ongoing emphasis on this being assessed by all staff involved in its application. The ideas in the literature around TCO seemed well embedded throughout the thinking of the school and the various aspects of its application seemed to be integral in their decision making.

This leads me to the finding that Schools in the study don't usually consider the full set of factors in the total cost of ownership (TCO). In summary, many of the schools had procurement decisions that focused solely on the costs of the hardware and software, and trying to reduce these while balancing them against the benefits for teaching and learning. The more robust processes evidenced a depth of research prior to investment that was supported by action research during the investment. Robust practices in some schools meant that there was a willingness to acknowledge investments that had underperformed and identify the causes. In some cases, especially where the school felt that the external research was inconclusive, they entailed an internal trial to assess the viability of an idea before committing to it on a wider basis. Some of the schools evidenced an absence of a clear vision by their answers around TCO. A plan that fails to train staff doesn't show 'leaders working hard with others to create and fashion a jointly owned, clear framework' (2014:150). It fails to encourage staff to share the learning practices that work and this results in a lack of proliferation of the leadership of the learning. It also seems to evidence, to borrow Buckingham (2007:29) phrase, 'policy invented on the hoof', which in turn leads to a lack of proper evaluation around the reasons for its success of failure.

There remained dissatisfaction in some schools about the quality of training available for staff to support a piece of technology. A few of the schools in the sample felt financial pressure on their ICT infrastructure. An effect of this pressure was to develop their thinking on the provision of a

more versatile technology that could be used in a range of environments. Tablet technology allowed for more versatility around the teaching space. There was recognition of the importance of training in the introduction of this type of technology. The majority of interviewees seemed comfortable with having achieved the balance between saving money and teaching/learning.

Conclusions

The research within the chapter has led to three findings, the first around the way that ICT spending has moved over the last ten years from a tactical role to become a strategic role in the schools, the second finding shows that the majority of these strategic leaders for ICT lack formal training for that role and the third finding highlights a failure on the part of senior leaders to consider all the factors bound up in the total cost of ownership (TCO) in much of the decision making.

Chapter 6 - ICT Spending in schools

Introduction

The study examines whether a contraction in public sector finance has altered the view of the role of ICT from the perspective of my eight senior leaders. In the previous chapter I looked at who makes the ICT spending decisions in their schools. In Chapter 2, we saw how the Coalition government placed an increased responsibility on such individuals by devolving decisions to a local level.

In this chapter, I aim to look at the second theme, around what processes and priorities are used by those leaders. In particular, I want to examine the priority that they are now giving to ICT and where does ICT sit in the list of significant spending within a school. In exploring this theme, I will look at the effect of the changes in the funding formula (that I mentioned in Chapter 2) and how this has affected the schools and the sustainable nature of the spending.

I have divided this second theme around the priorities used by the senior into five areas where I consider: how much each of the interviewees was budgeting for ICT; how the recent changes to the funding formula had affected the school; the effect of the change in government attitudes; how they planned to change spending; and whether they planned to use new technologies to change the ongoing costs.

The school budget for ICT

The responses to the first question highlighted that each of the schools is spending a substantial portion of their budget on staffing and premises. In Philip's institution, the budget was just under £6m with about 80% devoted to staffing (a figure that was reflected across the other schools in the study). After staffing costs, in every school within the study, relatively small percentages were left for all the other areas. Another significant part of whole school spending, for Philip, was the ongoing building running costs. The school allocated about £72k to spending on the physical ICT budget (this figure didn't include the costs associated with the leadership, management and technical infrastructure). It meant that about 1.2% of the total budget was spent directly on ICT hardware and software.

Matthew's school had an £8m budget. Matthew said that ICT would be in the top five significant spending areas. The annual expenditure on ICT was £221k, but this included the technical staffing wages. The budget for hardware and software at the school was £164k. Matthew had a very clear view of the total spending within his school and saw expenditure on projects in terms of total cost. This meant that about 2.05% of the total budget was being directly spent on ICT hardware and software.

Luke's school identified the second highest cost centre as the cost of maintaining the buildings, with this followed by ICT. Luke spoke about spending at least £85k on ICT hardware and software in the current academic year.

John's school had a budget of about £3.5m. The funding streams for ICT at the school were mixed, where some came from a departmental funding formula and part from development budgets. However, in the current year they were spending on hardware and software about £62k. This meant about 1.77% of the total budget was being spent on ICT.

At Jean's school the total budget was about £7m. In relation to the process of budget planning Jean commented, 'We don't really work out a percentage for each of the areas of spending. Instead, we look at the needs within the school and then prioritise the spending accordingly.' The process meant that the spending on ICT could be hidden within departmental capitation figures, but Jean said that 'We spent about £30k in the last year on ICT.' If this figure includes all hardware and software spending then it would represent one of the lowest percentages in the study, as it would only account for about 0.43% of the total school budget. The interview included an acknowledgement that the figure may be a little low, 'in the previous year the spending was much greater. This was due to our following the model of looking at the development needs highlighted by the departments and then using these to determine the spending.'

For Emily, the school budget stood at £5.5m. The second largest area of spending at the school was premises including the costs of the utilities, mirroring the second spend at Philip's school. 'ICT spending comes third and costs about 1 to 1 ½ % of the total budget.' The total spend in the last year on ICT was roughly £75k, which would equate to 1.36% of the total budget. In the current year, due to a building programme, they were expecting to spend an additional £60k which would amount to a total spend of £135k or 2.45%. This would be the largest percentage spend of any of

the schools in the sample. However, this was an unusual occurrence rather than a planned on-going event and should be discounted.

At Peter's school they spent above the average on staff (86%). Due to a recent rebuilding programme the school had not spent anything on ICT,

> 'as every single item in school was brand new from projectors, printers, laptops (just under 1000 students) with 450 wireless laptops. We have something in the region of 450 hardwired PCs the bulk of those are for admin use or in staff offices. We have four hardwired ICT suites, plus four other hardwired ICT suites.'

Clearly, the school was spending something on ICT as the response to question five was, 'In science last year we did buy some new laptops, and we provided two new trolleys of laptops.' However, this was not part of the broader ICT investment that was being monitored for sustainability. The initial spend on the ICT equipment at the school had been around £750k. Peter added that 'obviously in a new school the capital grant we receive is a lot less than in other schools and we are now budgeting for future spend in our overall yearly budget.' If the figure for the initial investment was replicated on a five year rolling cycle it would equate to a level spending of £150k of the budget.

At James' school the budget was about £150k for ICT and this had risen significantly over the last few years from around a £40k figure. The pattern shown by the interviewees correlates with level of spending you might expect if ICT is a key area for driving school improvement. SecEd quote a supplier from Dell, called James Quarles, who said at their symposium,

> ‘value for money’ was an issue that had evolved since the first ICT symposium in March 2010. But he was delighted to hear of teachers’ ‘continued experimentation’ and ‘widespread adoption’ of technology in schools.’ (SecEd., 2012:DT3)

The SecEd article begins ‘Technology is a fundamental part of education today.’ It then discusses how schools can evaluate and make decisions about their spending and embrace opportunities to maximise the value that they gain from it. Selwyn (2008) sees this in slightly different terms, when discussing the legacy of the Blair years,

> ‘The past ten years have seen education institutions taking control of their own ICT procurement beyond the initial central government funding. Indeed, the rise in UK government funding for ICTs since 1997 has created a large capital infrastructure, which most schools and colleges are now supporting with their own funds (Mee, 2007).’ (2008:705)

However, this raises the issue of sustainability for most schools. The NESTA (2012) report concludes that schools have spent £1.4bn in the last three years on educational technology. In relation to costs, they reflect on the growing movements towards “free” software,

> ‘One particular difficulty is considering the costs of using ‘free’ online programs and Apps. Signing up for a ‘free’ program usually requires teachers to provide basic information, such as name and email address, that can be highly valuable to companies for marketing purposes. Once access is given to a ‘free’ program, there may be charges associated with extending provisions: extra features or storage space, for example.’(NESTA, 2012:57)

This leads the authors of the NESTA report to conclude that teaching staff are an important determinant in the effectiveness of technology. The report highlights the further need for senior managers, technical staff and network managers who can influence teaching and learning and who have a sufficient grasp of how to utilise technological innovation.

This leads me to the finding that the ICT spending overhead is in the top five cost centres within secondary schools. My research in each of the schools in this study shows that one of the significant areas for spending was ICT. In 2007 before the global financial crisis, BECTA wrote,

> ‘Educational leaders are planning further investments in technology infrastructure not only to sustain existing provision but also to keep pace with constantly changing priorities and educational needs.’ (BECTA, 2007:3)

The intervening time period has seen a huge reduction in the range of ring fenced funding for school technology, such as the demise of e-learning credits and harnessing technology funds. Despite a focus on reduced finances across the public sector, this study shows that in this county many schools are seeking to protect their level of spending on ICT and view it as a significant aspect of the whole school plan.

The effect of changes in the funding formula

The NESTA (2012) report acknowledges the changes in the funding structures for most schools after the reduced finance measures of the Coalition government. At the same time it questions the effectiveness of the spending that has taken place on ICT and its ability to improve standards.

> 'The education sector has invested heavily in digital technology; but this investment has not yet resulted in the radical improvements to learning experiences and educational attainment. In 2011, the *Review of Education Capital* found that maintained schools spent £487 million on ICT equipment and services in 2009-2010. Since then, the education system has entered a state of flux with changes to the curriculum, shifts in funding, and increasing school autonomy.'(NESTA, 2012:8)

The finding is supported by other research that indicates the increasing autonomy has encouraged rather than discouraged outlay on ICT. Each year BESA issues a survey of spending within schools, the July 2012 report found that it was likely to increase.

> ‘The survey of 1,317 UK schools (766 primary, 551 secondary), which was conducted in July 2012 found that schools are assigning an increasing amount of their budget to technology, with a 2.1% rise (2.3 per cent in primary and 1.8 per cent in secondary)... The same research in 2011 showed a decline in ICT expenditure of 4.1 per cent in primary and 6.8 per cent in secondary education.’ (BESA, 2012)

The typical spend for a school in the sample is about one and a half percent of the total budget. Some of the schools in the study permitted this to vary, depending on the response of the school to various internal factors. Others appeared to feel that this figure was under pressure due to central government reducing the spending across the school. This is directly relevant to the section of the research question about the sustainability of the current ICT overheads in most schools. It is necessary to examine whether those interviewed intended to maintain, increase or decrease programmes for ICT.

The effect in the rural schools in the study

In the study, Philip, Luke, John and James were in more rural contexts. While, Matthew, Jean, Emily and Peter worked in a more urban environment. Philip spoke about a ‘slightly rising trend’, that was under pressure with the school cutting back in other areas. The ICT spend was struggling to keep up with the demands within the school from the replacement cycle. There was the intention to try to replace the equipment ‘on a cycle trying to replace every three to five years’ but with the current fiscal pressures ‘that cycle is now slipping to every six or seven years.’

Luke's school had just converted to an academy and, following a review of structures, had chosen to increase the pay of the support staffing, feeling that they needed greater remuneration than had been reflected in the pay structures of the county system. The school was investing in a virtualisation project with the aim that this would ultimately reduce the spending on ICT. This was as a result of the ability of virtualisation to cut the electricity costs (due to a reduction in the number of servers, which then required less air conditioning), and the costs of server replacement, and ultimately to remove the need for desktop replacement (as each of the desktop machines could simply be clones that were produced by the server). They had also invested in interactive whiteboards within one subject area and were looking at the use of ActiveExpression tablets as a way of building more interactivity into the lesson environment.

At John's school, they had a similar approach with the replacement cycle running alongside the continued introduction of new machines. On the one hand they were replacing ICT suites and on the other they were introducing new laptop suites into MFL. While in raw terms the amount of money was not as high at the school as some in the sample, in percentage terms it was only bettered by Matthew's school. John had made a decision to spend more money on ICT and had taken this decision for approval to the governors. 'I have made a point since I have been here to pump in quite a bit of money.' As we saw in the previous section, this equated to 1.77% of the total budget in the previous year.

James enjoyed an ICT budget that had tripled in size over the last few years. They had invested a significant portion of funding into the less noticeable system infrastructure. James felt that the

school had historically been investing solely in visible projects, such as desktop machines. This type of spending strategy carries potential risks about the reliability of the system. 'In terms of infrastructure the school had a lot of machines which they have replaced but had kept the infrastructure as just the same. We put a lot of money into infrastructure and the support contracts.' Having addressed the perceived shortcomings in the infrastructure they proceeded to rationalise the hardware. 'The next step was to make sure that the hardware was working all the time. The next step was to look at the idea of the computers we had - and there is absolutely no point in having half a suite of computers. It doesn't work.' Having achieved these goals, the school were then creating a rolling programme for the replacement of the equipment. James held the view that one of the major changes in the spending of the school had been in the shift towards freeware in education, or at the very least a significant lowering in the ongoing costs of software to schools.

The effect in the urban schools in the study

As already identified, amongst the interviewees, Matthew, Jean, Emily and Peter worked in a more urban environment. Peter's situation was different to all the other schools in the sample, as they had a significant investment associated with a new build that had shaped the subsequent spending. The school had not been investing directly on ICT and had been saving funds to support future investments. However, it was planning ahead and looking at methods of cutting back on the costs of provision. The school had been investigating the introduction of blade servers that would be cloud based rather than their current internally housed alternative. This change to a

cloud based system potentially offered savings of about seventy five percent of the cost of the installation. The school saw an important place for ICT in its future budgeting and planning.

At Matthew's school the trend had remained static for a number of years, but this should be viewed in the context of the answer to question one where the level of spending was quite high. The school had built into its spending the practice of setting a sum of money aside for innovations and this had been done after consultation with the governors.

At Jean's institution, the funding was dropping due to financial pressures that had been externally imposed. However, she felt that the institution was responsive to the needs of its departments and looked at ways of achieving the right levels of funding from a communal view of the needs of the whole school:

> 'For the school our spending has completely dropped and the funds have been subsumed from harnessing technology into the DFC funds. We were aware this would happen and planned for it by looking at what we top sliced from capitation and what could be paid for through other funding streams.'

Emily spoke of a pattern that was broadly based around an ongoing replacement programme that was supplemented by a one-off building project. She felt 'it is about maintaining the numbers in ICT suites and the 1:5 pupil to machine ratio.' In the course of the research, Emily was the only person who referred to this benchmark that had been set under the last Labour government. While the ratio was a factor in her thinking, I suspect the measure had largely fallen into disuse. She felt a measure of annoyance at the way a political decision had altered the rules for localised

spending. ‘A number of years ago you could only do premises and buildings with capital and we had drawn down our money from projects that we needed to do. The rules changed and you could spend it on things like ICT and at the same time the overall budget started to decrease and the numbers coming into the school started to decrease.’ In this scenario, the local decision was being made about what to spend and when to spend it, but there was unease at a subsequent alteration in the nature of the funding formulae that could have given other local schools an advantage in how they used the money.

The changes within all the schools were being driven by the amount of funding devolved by central government. However, each individual school had responded to the cut in centralised funds in a different way. Some were in a cost cutting situation and were continuing to invest in increasing the ICT provision, while others were reducing all the costs proportionally.

The ring fenced sums of money that Luke referred to were a hallmark of the approach of the New Labour government. They thought that putting specific sums of money to specific causes would ensure that the money for ICT didn’t become subsumed in a general school budget and used for other purposes. However, the responses of Peter and Matthew would suggest that they were continuing to spend money on ICT in a significant way after the demise of ring fenced funding. Of the interviewees 40 per cent argued that ICT fitted their vision of education and how it was made relevant to pupils living in a modern world.

Younie (2006) points to the disparities in funding that were apparent under the New Labour regime with some authorities identified as *Pathfinders* and others as *Education Action Zones* that

were funded much more generously than other schools. This was a deliberate and targeted intervention on behalf of the government that was designed to raise standards in some areas. This funding difference led to procurement contracts and technology being more readily available in certain geographic areas. The county in the study, as a whole, did not benefit from many of these income streams, with procurement and resultant levels of technology being described at best as patchy. Some of the schools in the larger conurbations had benefitted during the New Labour years and were now struggling to adapt to the reduced income of the Conservative Liberal Coalition. Other schools in the study that were in leafy rural areas were attempting to catchup on the spending disparities that had existed between them and their urban counterparts. The Leader magazine for September 2010 commented that,

> 'as cuts in the education budget start to bite every area of spending, investment in ICT is under close scrutiny both in terms of efficiency and pupil outcomes.'
>
> (Carrington, 2010: 12)

It then goes on the exemplify a range of areas where schools have used different technologies to reduce on-going costs, such as: with RFID access to a pull-printing solution; the development of an e-mentoring scheme across schools in Suffolk; the simplification of the recruitment processes in schools; and the use of data to intervene earlier. Matthew's school were currently investing in mobile technologies as the next step in their development. He could reflect on a field trip to a 'huge purpose built school' in another country where they were 'building ICT labs and I thought hang on a minute, that is probably not the best way forward which is in the handheld and mobile technologies.' Matthew added, 'every stage we are happy has returned the investment in time and money. They also tend to be time limited as there is always the next technological advance.'

Matthew's school tends to support the findings in the existing research. It exhibited a distributed approach to the leadership of ICT that created a stable leadership culture. From this culture you could then see a sound procurement and investment process that considered a range of factors and happily planned for the next stage. He openly admitted that 'we have focused so far quite heavily on teaching and learning' and at the same time they saw the importance of reviewing their existing staff and challenging their capacity for the next level of change.

A difficulty for many schools, who are given central government investment in ICT, is that unless it is accompanied by an on-going income stream then it is almost impossible to replace the devices when they become old. The issue of sustainability of an investment is key to any decision to invest heavily in a new technology, whether it is a result of a central government initiative or an outlay from the governing body. As already discussed in the previous chapter under TCO, BECTA (2006b) identify nine factors in creating a sustainable ICT strategy. These are,

‘1. Assess the quality of facilities and services needed to support the ICT development plan.

2. Audit existing infrastructure provision, equipment age and costs.

3. Identify the impact of existing provision and practices on staff (and possibly pupil) satisfaction, confidence and competence.

4. Review staff training needs.

5. Compare current costs against relevant internal and external benchmarks.

6. Review current procurement practice and value-for-money processes.

7. Challenge assumptions about the quality and value of current technical support services and practices.

8. Reassess the quality of facilities and services needed to support the ICT development plan in light of these reviews.

9. Plan and introduce a rolling three-year whole school budget, which includes a realistic proportion allocated to ICT-related costs, based on the development plan.’

I looked for evidence of this type of planning in the structuring of the successful and unsuccessful developments. In a climate of changing finances some schools have continued to commit to a budget and a plan, but the temptation to alter these fiscal forecasts is inevitable. Many of the schools are looking at infrastructure as a method of delivering cost reductions. Schools are showing that the pressures of ‘reducing finances’ are making them critically examine what systems they are running and the free alternatives available. Some of the schools in the study

have reduced costs and have been seeking to cut costs as a primary driver. Sharing these ideas is a useful outcome of the research.

James entered his school from the ICT industry and had experience in management of systems. It is not surprising that his choice of the most successful spend was something that would easily be underappreciated in many schools. When asked question eleven,

> 'This is quite an easy one. The change of our infrastructure. Historically, we had servers that were ex-library machines and it was uncomfortable when things were failing. We also had a mismatch of systems and had used sandwich students to provide support. Any sandwich student comes in with new ideas and implements them in a live situation. We had systems running who knows what all over the place.'

I feel that James' answer is grounded in a solid grasp of pedagogy and creating a system that simply works! It embodies the BECTA (2006) factors around auditing and reviewing the existing provision. It is easy for schools to ignore the questions around sustainability as they seek the next attractive piece of software to sit on a desktop. James showed an intuitive understanding that most teachers want a system that they can rely on and that investment in infrastructure is an extremely important part of the process. James understood the on-going need for a solid infrastructure that allowed developments on top of it.

> ‘The mistake that we made before was trying to fundamentally do things on a shoe string and we knew that prior to implementing the new hardware and infrastructure. We invested £10k on servers running new software and it was wrong. We tried to build the servers ourselves and run everything on open source software. It was wrong because it is at the core that the organisation needs a good infrastructure on which to run. You can look at the costs but some you don’t change like your gas and electricity on your home budget.’

The response is based in a critical look at the existing procurement processes and challenging the costs to ensure value for money. This is institutionally difficult as it requires school leaders to identify their own mistakes. It is important to be self-critical and acknowledge where things have gone awry.

James provided a specific example of a process that was driven by micro politics and the availability of money (under the New Labour government).

> ‘Science… struggle with access to ICT and the problem of wet and dry labs. We got the ‘ok’ to convert a lab to a semi-ICT suite and had it re-cabled and filled it full with laptops. In two or three months all the laptops were wrecked and we pulled it all back out again and it was a complete waste of time. We had misunderstood the use and requirements of the area. We were trying to fix something that we didn’t understand why it was broken.’

James identified the micro level of politics that are common within school processes, particularly where the decision making lacks transparency and staff feel that they have to jostle to gain the investment in 'their' area.

> 'Lots of staff were talking about how they used ICT in lessons, and the change was because the Science teachers were jealous that they didn't have their own ICT facilities, and we jumped and we shouldn't have done. This was done under the previous government.'

This leads me to the finding that the schools in the study (particularly in the rural parts) were not showing a significant drop in overall spending on ICT due to 'reducing finances' measures from the government. The BECTA policy advice is still relevant today, school leaders need to audit their existing provision and self critically examine procurement processes and value for money. At the same time I am mindful of a comment of Luke's that, 'ICT is a hungry dog: once you begin to feed it, it wants more and more.'

The response to the changed attitude of government

The SecEd report (2012) cites Dave Ford, an assistant head in Canvey Island and an ICT Champion for BSF in Essex, who wanted schools to focus on what technology should achieve and to use that framework to begin a discussion with staff, students and parents.

> 'He said, 'I remember a few years ago when money and kit were thrown at schools without working out what it was going to be used for.' (SecEd, 2012: DT1)

The BESA (2012) report supports the idea that the increased autonomy within schools has increased the spending on ICT. The interviewees within this study felt able to determine how money should be most profitably spent within their schools. They thought that ring-fenced central funds had led to money being spent inappropriately, but facing declining finances that it would be inappropriate to cut spending on ICT. Some of the spending highlighted within the study was on areas that were designed to bring long term savings. The change in national direction is highlighted by Selwyn,

> 'During the 1990s and 2000s schools' "ICT" benefited greatly from the symbolic need for the state to be seen to respond to the mainstream emergence of the internet and the need to recast Britain as a "modern", "socially-just" knowledge society. Now at the beginning of the 2010s, schools digital technology is reflecting the symbolic need for the state to be seen to cut public spending, reduce budget deficits and decentralise the provision and governance of public services... For the time being the UK is again leading the way with educational technology policy – albeit in a retreatist rather than expansionist manner.' (2011:407)

Jean commented that faced with economising she had made a set of necessary decisions. 'The drop in funding has caused us to look at what we should keep and what we should loose, so for example, we got rid of SAM learning.' When I queried the role of the government with Luke, he spoke of the change in approach between that adopted by the Labour and the subsequent Coalition government.

> ‘There was a time when the government spent a lot of money, directly and indirectly on ICT and that has gone now. The harnessing technology - gone, e-learning credits – gone, and all of that money – in terms of e-learning credits - it was a very generous amount of money that was available.’

At the end of Question 6 he supported BESA, ‘I don’t feel any massive pressure from the government. The money comes into school and we determine how we use it.’ This line of thought continued into Question 8 with the response, ‘Personally I don’t think we have seen any great steer from them in terms of what we should be doing.’ Luke added an interesting observation about the unintended consequences of the government’s attempts to control the localised spending decisions with ring fenced funding. He said, speaking about the New Labour approach,

> ‘At that point in time the degree of rigour that I would apply, to an application for a piece of software that was available to be bought using e-learning credits, went down because the money was available, and I didn’t need to massively prioritise, and if the money was available for a piece of software then I guess it was partly responsible for the proliferation of software within schools. I think we probably run on... our image has... 100 different pieces of software and some of them that we don’t keep up now and pay the license fee, and some of those were a one off cost that we no longer use.’

Philip summed up his response about the role of government on ICT spending with, ‘I don’t feel pressure from government in terms of spending in any particular way.’ He would suggest that the rhetoric of the Coalition government, about leaving schools to determine what is best for

themselves rather than trying to direct and channel spending through multiple ring fenced sums of money and targets, such as parental portals, was being felt on the ground.

Peter's school was in a more challenging socio-economic context than most of those within the study. In this situation the wider influences centred on the accessibility of ICT within the home. The school had engaged successfully with the central initiative under the Labour government to provide laptops for students, and had claimed more than any other school in the authority. In the changed context they were working with private sector firms, such as a building contractor, to develop initiatives like a wireless cloud across the nearby social housing. They were also seeking to help the students by developing skills amongst the parents. While the nature of the work is different in this school to many of the others, the overt influence of parents and pupils is the same. Reduced finances measures have ended the central government initiative to provide laptops, but the school had responded and was finding an alternative way by working with the private sector. Peter went on to comment about how these changes had focused their thinking on aligning curricula with the local job market.

> 'We are also coming under pressure, like most schools, from business and industry for specific skills, whether that is a local engineering firm or Bentley, for CAD skills or from local business who say they want students who are more adept with spreadsheet and database skills. We are developing a curriculum that will deliver those skills for the local employers.'

An aspect of the changes that took place under the Coalition funding arrangements was to simplify the formula into a single stream of money. Under the New Labour government money was set aside specifically for schools in challenging contexts and this was part of a centralised approach to use education to reduce social inequalities and address social justice type issues. The changes to the funding probably had a lesser effect on most schools in the study than elsewhere, but the equalisation of the funding across schools could be argued to have been a profoundly political decision that would have a real impact on local decisions. In this example the school had responded to a loss of public money by seeking support in the private sector.

James felt that the ICT sales industry was a major influence on the local spending within schools. In his opinion, the successful high pressure selling by some commercial organisations was often leading to poor decisions that lacked any depth of research. This links back to my last finding in the previous chapter which showed that schools can fail to consider the full set of factors in the cost of ownership which in turn, as I said in that same chapter, was down to strategic leadership which has not been adequately trained.

> 'Purchasing often takes place for a problem that doesn't necessarily exist. We went down the process of looking for a new MIS without fundamentally understanding what we wanted. We hadn't done a list of requirements and we were looking for another MIS system. It is insane – you wouldn't do it at home. You wouldn't buy the latest gadget without knowing what it did and why you need it.'

He added that sometimes these commercial organisations would use government statements to aid the case they were making to sell their own products. 'It is a cop out to try to blame the department for education for the sudden pressure on safeguarding and access control systems. I don't believe that pressure is there from the government.' The removal of central government targets had improved the way that he felt monies were being spent. The atmosphere of reduced finances had made them look more critically at what was being bought. The atmosphere made strategic leaders look more critically at the vision and then examine carefully potential issues with the TCO.

> 'In relation to the idea of cuts, when I came in and started this role the drive was to get as many computers as possible within classrooms, and this was shown in the school PLASC return which specified the exact ratio of students to machines. I think 'they' started to realise they didn't know what these machines were doing, and what the value added was on this, and that is when I saw things starting to slow down, and internal cuts as people started to say let's not just buy all these computers, and look at what they are being used for.'

John, another head teacher, had a similar reflection to Luke about the approach of the New Labour government.

> 'Sometimes. Again I can remember when governments, particularly previous ones, provided specific budgets for IT, like the computers for teachers or NOF. Schools have to be responsive to that and I think what schools have always tried to do is to make those initiatives work for the pupils that they have got.'

Here the local decision maker did feel more adept at making a particular centralised policy initiative work. He was consciously reacting against a centralised policy initiative, such as that of New Labour, to adapt that policy and make it appropriate for the school. John sought to clarify what he perceived to be the role of government, 'Governments often come up with the broad idea, but when it comes down to it we are the ones that have got to make it work, and I think to be fair to education that we have often made it work and we shouldn't be reticent in recognising that fact.' John, like the other interviewees, felt that the local decision maker was broadly independent of the government.

This leads me to the finding that a cut in overall funding from government could have improved the way that money is spent within schools. The mechanism, that the Coalition appeared to be employing to drive school based change in how they made decisions and set priorities, was to build specific criteria into the OFSTED framework. It would appear that one of the effects of reducing funding streams available to schools has been to make them question how they pay for projects. It has also made them more open to questioning whether projects will be beneficial to their own communities and rejecting ideas that they think are inappropriate. Some schools have turned away from semi-bespoke software with an annual license, such as SAM Learning, while others are finding greater savings in freeware or in structural changes, like virtualisation and cloud based approaches. In this context, it is important to have senior leaders who understand how to support and challenge the processes and issues around the TCO and who can articulate this strategy.

Priorities around the ICT spend

The figures cited by Bailey (2010) showed 84% of schools in 2010 worried about a drop in their budget. BESA (2010) estimated that budgets in 2010 were to be reduced by £23million in primary and £17million in secondary schools. This equated to an average drop in 2010 of about £1000 per primary and £4000 per secondary school. In 2011 there was to be a further decline in ICT budgets to £502 million from the 2010 figure of £537 million. However, these reductions in budgets were not equally spread across schools as the funding streams were weighted to specific schemes that fulfilled the New Labour political agenda. It should be noted that in a budget of nearly £1m, a reduction of £4k to a secondary school is not a major cut for leadership teams committed to a particular vision for ICT. Equally, a school's view on the cut in spending could be largely determined by how many ring fenced funding streams it was able to access under the Labour government.

In their answers, seven of the eight schools in the study were showing on-going levels of investment in ICT of around £70k (Jean's school was the anomaly). If the reduced finance was wholly to affect ICT and it was equally spread across the whole of the school budget headings then this would not represent a huge retrenchment in ambitions. However, I would have expected those schools with an aptitude for accessing funding streams to be affected more heavily in the short-term. The earlier findings that urban schools faced a greater reduction due to government cutting finances would lead to the prediction of a greater effect on their longer term planning, unless they found alternative revenue streams.

Priorities for spending within the schools in an urban environment

Jean, in a fairly urban environment, thought that there had been a significant fall in their funding with the change of political administration.

> 'For the school our spending has completely dropped and the funds have been subsumed from harnessing technology into the DFC funds. We were aware this would happen and planned for it by looking at what we top sliced from capitation and what could be paid for through other funding streams. The drop in funding has caused us to look at what we should keep and what we should loose, so for example, we got rid of SAM learning. We have also used what we could have spent on ICT for development funding by departments and got them to bid for bursaries.'

Similarly, Emily who was also in an urban environment was experiencing fiscal pressure on the ICT budget. The difficulty for her was that she also felt under pressure to maintain the spending on ICT because of commercial pressure on the school and how its facilities were perceived by parents within the catchment area. She reflected at length very directly on the competition within the town. However, I have chosen not to include this aspect of the response in order to preserve her anonymity and I have also edited out specific data that would have made her identifiable in what she said. She believed,

> ‘We spent less on ICT last year... we only spent around £50k. This year we are spending on screens and projectors and bringing ourselves into the 21st century... We have a seven form entry and we are attracting in September fewer pupils, and that trend goes on for four years. So we have to make ourselves look attractive from a marketing point of view and we have to compete with the other schools that are out there.’

I probed Emily further, ‘A few years ago, there were quite a lot of ring fenced funds like NGfL and now that seems to have changed to give schools much more choice. Do you feel that has had an effect in terms of how you spend money on ICT?’ Her reply indicated that while the spending had dropped on the previous year, she wasn’t trying to save on the ICT budget,

> ‘No, I don’t think so. We are still giving ICT the same priority as we did before. We have tended to reduce budgets in other areas... Some areas of the budget have suffered for us to be able to maintain that. The capital side of the budget has gone down and we don’t have other streams of funding.’

Aspects of her answer reflected on value for money and the observation that schools who were committed to a particular vision could find the funds within income streams to support that particular area. Emily saw an importance in spending on ICT for a variety of reasons, including curriculum and marketing, and this meant that she had to decide on how to spend the central sums to support these areas. Her answer shows the complexity of trying to control the system from the centre. If the money is all rolled into a single income stream then schools prioritise as

they see fit. Some will spend in radically different ways to others. If a central planner placed money into a ring fenced pot then as various interviewees noted, this meant that money was spent more carelessly at the school as the local decision maker had less control over the destination of the money.

Peter's answer was influenced by the loss of money that he felt had affected schools in a more urban context. The total sum of money being devolved to schools in particular neighbourhoods or demographic areas is clearly something that is widely open to political interference. If the New Labour government saw ICT as a means of reducing social inequalities, and this fitted with their political ends, then they provided additional funding to urban schools that needed it. Similarly, if a Conservative Coalition didn't see the political importance of educational technology, then it might naturally change the funding formula to be more equal for all schools. Peter felt that there had been a political change of will towards schools in his context.

> 'It depends on how you view the Coalition, as to whether it is the view of one man or the view of the whole Coalition. The Labour government had a view point that schools like ours did relatively well, where our leafy suburb neighbours can walk into places like this with open mouths... Clearly, there are going to be less funding streams to support ICT across the whole school. The funding streams were based around specialist school and pupil premium type budgets so the changes that are in the pipeline are likely to have a massive impact.'

Matthew's school was in an urban environment but he had managed to acquire funding so that his finances allowed him to increase his spending on ICT. The effect of this on the day to day

process was part of a wider unfolding of a vision of an e-confident school. He showed that he had already committed sizable funding to more invisible projects, such as the network and the wireless signal, before going for the highly visible use of iPads. I think that there are aspects of Matthew's response which are useful to all those managing ICT projects in school, particularly in how to build up to a major change and to pilot a major implementation rather than going for the more risky direct transition (which in my experience is all too common in schools). The full process at Matthew's school is explored in more depth in Chapter 9.

The overwhelming majority of the urban schools in this study were facing financial pressures on their spending patterns in ICT. Only Matthew could reflect on an upward pattern and this was linked to his ability to attract alternative funding and his firm personal commitment to the use of ICT within education.

Priorities for spending within the schools in a rural environment

John was in a fairly rural setting and he felt that his budget priorities had not been affected in a major way by the change of political oversight. He thought that the budgeting process was still one of prioritisation, but at no stage in his answer did he reflect any view of major retrenchment, although he did allude to a tighter budget in the current round. He saw that ICT was a heavy ongoing commitment and that spending on ICT would involve a balancing act between being at the cutting edge of technology and at a level that was affordable. He had worked in schools where the governing body had not appreciated the ever changing demands and spending commitments. In his current school he was happy that a robust rolling programme was in place to 'upgrade

existing hardware, software and that the ICT network manager had an infrastructure that was better than most schools.' He commented on a process involving the leadership team that used these rolling funds to address short term priorities,

> 'To be honest, I suppose what we have tried to do, along with senior colleagues and governors, is to decide as a school what we need to provide and then to find a budget for it. That is a bit idealistic. It doesn't always work like that. Sometimes we have had to delay as the budget has been a bit tight but we start from the point of thinking what do we really need to do. For example, a few years ago one of the priorities was to install a set of electronic whiteboards and every department has at least one. Languages has one in each of its three

Luke's school which was also in a rural town setting could reflect on a pattern of increased spending. He was implementing a virtualisation project which would reduce his overheads in the longer term.

> 'We are investing in the ICT team and have done a support staff review that means we are investing more in the ICT team. Since becoming an academy we have reviewed the work of all staff, and we recognise the importance of the ICT team, and what they are doing for us, and we have moved them all up by one grade. One of the big projects that we have on at the moment is a virtualisation project, and at the first stage of that we are ensuring that our network and our school infrastructure is a far more robust system, with incredible amounts of redundancy built into the system, so that we shouldn't have a problem.'

After giving the details of a rigorous financial procurement process, he then identified further spending, 'On top of that the overall allocation, after I went to the finance committee of the governors and asked for additional funding, and was given £60k.' He explained that he had chosen to spend the money on things like voting tablets in subjects that would benefit from testing the students' grasp of ideas. The details of the procurement process included further development of the procedure of virtualisation and the carefully weighed costing behind his decision to purchase machines rather than build them in house. The government had clearly not hampered his virtualisation scheme and his spending plans as he ended by saying,

> 'I am riding a wave at the moment as the governors are keen, and I plan to ask them for another set of money because the governors are keen, and we may have reached the stage now where we no longer replace desktop machines. The most recent replacement was one computer room at Easter and those may be the last ones that we ever do.'

James had seen his budget fluctuate but it was showing an increasing trend and this was accompanied by a change in attitude towards free software alternatives. He said,

> 'At the start the budget was around £40k or £50k. The second year it jumped to £150k… The budget last year fell to £50k, and this year on the core budget it is about £96k, with various budgets for various projects on top of that which brings it to around the £150k mark... The other major change has been in software, where in the early days very expensive software was being brought into schools, and now this has really died off and people are looking at the free alternatives.'

this leads me to the finding that in the face of fiscal pressures, the urban schools in the study were more inclined to retrench and cut spending than the rural schools. All schools were trying to support spending on ICT, even when they faced a reduction in the overall budget. The sample within this study would suggest that rural schools benefited from a broadly positive fiscal effect with the change of government and that they were investing in a range of projects that were suited to their own needs or likely to bring longer term cost reductions. It would also indicate that centralised decision making had a limited effect on the local decision making and that this latter type was being encouraged by central government at that time.

Traditional or Emerging curriculum

The questionnaire design was built around a set of opening questions on the mechanics of school finance with the fourth question intended as a hinge question in the interview. It linked the ideas around the vision with those of the pressures and views that informed it.

We have already seen that New Labour was keen to encourage investment in the ICT technologies as a means of promoting a knowledge economy and international competitiveness. Gordon Brown, speaking as Chancellor said,

> 'economies like ours have no choice but to out-innovate and out-perform competitors by the excellence of our science and education, the quality of infrastructure and environment, and by our flexibility and our levels of creativity and entrepreneurship.' (Brown, 2006)

The link between their spending on ICT and these economics goals was clear,

> 'Young people now have direct access to more information than previous generations could guess of, and are often more expert than adults at finding their way to it. Schools will need to think through the implications of this for their own future roles. New technologies present unprecedented opportunities for young people to broaden their horizons; to find new modes of creativity and to deepen their understanding of the world around them. Schools also have resources available through these technologies to transform methods of teaching and learning.' (DFES, 2006)

The Coalition government claimed that they were not determining centrally where money was spent. It was interesting to note how the interviewees within the study internalised the dialogue of international competitiveness, or whether they saw that good teaching took many forms that included ICT, without it necessarily being the solution to many school problems.

While Butt and Cebulla (2006) show that e-maturity is an important part of school improvement it doesn't stand alone and is usually linked with other significant things like the school ethos and leadership styles. E-maturity could just be an effect of having an efficient leadership team and, therefore, its absence in an overall educational vision might be better viewed as indicative of a lack of effective leadership. Ann Gill writes, as a head your vision for ICT can feel like you are climbing a hill with many false summits and that while, 'Reaching the summit may not be possible, but that doesn't diminish the importance of the journey.' (Gill, 2007:6)

Gill's experience in primary schools is reflected in the views of secondary head teachers. However, the important question remains about how they thought it fitted with their view of what education is about. Or viewed another way, the question was how did ICT match their aspirations as a leader to develop their school?

There is an element of this question that is philosophical in its tone. The interviewees could take a practical view of the need for ICT to do a whole plethora of jobs in modern society. They could have bought into the globalisation rhetoric of the Edutopians which bombards schools with a promise of revolutionary and necessary change (from an array of sources including, international corporations, film companies, specialist producers, policy advisers and even neo-liberal policy makers). I was hoping to discover their view of why ICT matters and from that how they resolved the thorny questions around pedagogy, socialisation and exclusion. Did they have a vision, or just a resigned acceptance of a widespread dogma?

> 'ICT is integral to most areas of school development and can no longer be seen as merely a curriculum area to be delivered in our classrooms. It has become an aspect permeating all areas of work in school. We need it for pupil records, for tracking assessment, for financial management, to support teaching, learning and assessment, in curriculum and development planning, for enhancing creativity through multi-media presentations and improving communications within our schools and further afield.' (Gill, 2007: 6)

There are still those in my experience in schools who would disagree with Gill's comments and argue that they can still manage without too much reliance on technology. However, for most

leaders this wide ranging list of areas that are impacted by ICT in school is a reflection on of how it has changed teachers' lives. It was interesting to see whether any of my interviewees had a different type of leadership commitment based on a more philosophical view of where education is going. Ertmer et al. (1999) in an American case study on primary teachers categorised their opinions of ICT into three groupings - those who saw it: as a supplement to the curriculum; as an enrichment of the current curriculum; or as a facilitator behind an emerging curriculum.

We have already seen that both Buckingham (2007) and Selwyn (2011, 2014) are sceptical about any empirical evidence for the widespread use of ICT in any other way than to supplement or enrich the curriculum. The categories suggested by Ertmer remain a useful tool to view the responses. The three categories overlay with those of the Dystopian who see it mainly as a supplement to teaching. Emily's response fell into the category of viewing ICT as a supplement to the curriculum. She said,

> 'I think from everyone's point of view, including governors, it is one of the highest priorities as we want students that have the skills for the future, and we can't do that without having teachers that are equipped with those types of tools to do it, and students having proper access to ICT suites. Everyone would like an ICT suite in their department but we have tended not to do that and we have provided bookable suites (because that is the only way that you can run it and the only way that you can man it). When at governors' meetings, and we are at the situation of looking at the finance for the year, it is one of the things that is in the governors' minds.'

James' response to the question demonstrated a view of ICT as supplementing the curriculum and supporting the school, and at other times he showed a place for the role of ICT in enriching the teaching and learning experience. He said,

> 'The spending of the money on ICT is to invest in a tool to aid teaching and learning. The investment isn't on a particular package or piece of hardware that adds value to just one curriculum area. It is like a textbook and is a tool that will aid teaching and learning. It is a mechanism to access teaching materials. The ICT is not in specific areas around the school it is across the board from food technology to drama. There is less in areas like Physical Education, although on the Physical Education BTEC the ICT facilities are heavily used. It is a mechanism for the delivery of teaching materials.'

In his broader responses James generally saw ICT as enriching the curriculum and focused on the practicalities of technology that worked. In his reply to Question 6, for example, he disagreed with the push for Raspberry Pi machines as there was 'a fundamental lack of knowledge within schools as to the benefits that a particular piece of ICT will bring.'

John saw ICT as an enrichment to the curriculum within his school. It was something that he had prioritised because he believed that it added to the educational experience of young people and equipped them better to serve in the world of work. As a long standing head-teacher, he acknowledged the professional development that this had demanded of some of his staff, but was clear in his own mind that this was ultimately to the benefit of the students they served. He said that ICT fitted with his education vision,

> ‘I think, quite fundamentally our job as educators is to provide the pupils that are in our care with the skills and knowledge that they can use when they leave school...

John felt part of a generation of teachers who had constantly need to catch-up on technology which was being introduced. He used the mobile phone example, where his staff had been a little resistant to the use of phones and wanted to ban them. John had resisted this, as he felt that phones have learning potential,

> ‘I always think, with ICT, that it is the one area within education that most staff feel the most vulnerable. It is the one area that some staff know less than the kids and that is unusual for teachers…. From a teacher’s point of view that makes them very vulnerable… You see the kids on the mobile phones at break, and what they are logging into, and we are missing a trick.’

Peter was firmly of the view that ICT should enhance and enrich the curriculum. In his response, he took personal charge of scrutinising requests as he looked for their potential impact. He said,

> ‘if it doesn’t have an impact on outcomes and improve the quality of teaching and learning, we don’t embark on a journey with that, in whatever guise it might be... You can go to BETT and see all this glorious technology and you have to ask what are the tangible outcomes that you can hang your hat on and say that is giving us something different in the classroom.’

At this point I asked Peter, 'what sort of outcomes are you looking for?' and the answer was a direct and immediate example drawn from the classroom. He had invested on ICT in Design Technology because it allowed boys to improve their presentation of work. He felt that this change had meant that 'while boys typically are not as good in presentation skills, and it overcame that hurdle, and you could see their self-esteem and confidence improve in a matter of weeks.' This approach to what was useful within the classroom made him resistant to the pressure he was coming under to purchase iPads. His view of tablet technology was summed up with, 'Suffice to say, without sounding negative I think there are a lot of toys out there and I am not sure what impact they are having.'

Luke also saw the enrichment that ICT had brought to the curriculum and alluded to its potential in developing new curriculum ideas. However, while he wanted to harness a range of new technologies this was often for the practical opportunities it gave to engage students more fully in the learning process. He said,

> 'For me ICT is all about removing barriers to learning: enhancing the teaching and learning that can take place, making it relevant, making it current... How do you take something like social networking and get a learning spin on that. It is so hard for people who have been around a little bit to understand what it is that makes a 13 year old tick. If you can tap into that it is special, and looking at ways in which would, can engage with that without them really realising it.'

There was a refreshing enthusiasm in this answer of Luke. He saw ICT as a mechanism to support his desire to enrich teaching and learning within his school.

Jean's response had aspects that are looking to the third category of Ertmer et al. (1999) as she talked about the vision of an e-confident community. However, the majority of the answer was focused on using ICT to enrich the teaching and learning curriculum. She said,

> 'The school has a vision to be part of an e-confident community. We established the vision three years ago and we feel that we have met it, but as always, there is also still more that we have to do for it. Every time there is a move and a new piece of technology then we need to equip people for it and so it is constantly evolving. We have been developing the use of ICT within the school to a point where it can enhance teaching and learning.'

Philip's response fell between the second and third categories of the American case study. There were times when he spoke about how the existing curriculum had been enriched and then there were others where he talked about a curriculum that would happen. He said,

> 'If I was to actually say that in the classroom in terms of teaching and learning the ICT usage has been paramount – it really has. Every single teacher uses it in some form, even using it to project onto the wall images or whatever it happens to be – right the way down to the Physical Education department using ITouches and kids video recording themselves.. ICT has a very broad use and it is paramount in terms of the teaching and learning that is going on within the school and is central to that.'

I followed this up with, **'**presumably you have projectors in classrooms and things like that?' which encouraged him to continue and say,

> 'We have projectors in every classroom and we have interactive whiteboards in pretty well every one. I think the interactive whiteboards have been our biggest waste of money – most staff use them as a projector screen or background and you can do that in other ways so from our point of view – if those fail we will keep the projector but not the board.'

Philip described classroom computers that were used for lesson registration and behaviour management alongside the availability of five ICT suites and a library equipped with computers. He felt that ICT represented a tool in his school that was 'part and parcel of everyday life.'

In his responses to the end of question 6, after talking about the role of technology to support teaching and learning, Philip showed that he had grasped the idea of an emerging curriculum, but that he was still in an institution that was coming to grips with an enriched curriculum. He said,

> 'technology can support teaching and learning – I don't think that we are anyway close to where we could be, in terms of its use. My head is a total ICT phobe and for him it is like a necessary tool rather than an exciting tool and I just think it has marvellous potential in terms of what you can actually do with it.'

Matthew was fully in the category of seeing the potential of ICT as an enriched curriculum. He said,

> 'given our context we hope to be able to produce future leaders and people who can have an influential role within society. The ICT aspect of this is recognition that it is the world in which our students will inhabit and if we don't prepare them for that then we will not be doing our job.'

This leads me to the finding that the schools in the study saw ICT predominately as an enrichment to the traditional curriculum centred on pen and paper exercises, rather than as something that was bringing in an emerging curriculum.

All my interviewees would fit within the arguments of Selwyn and Buckingham about the role and the use of ICT within schools. All had a vision of teaching and learning that involved schools and many traditional aspects of teaching. There was a variation in the quality of the vision about how ICT could be used to enrich and extend that practice.

The role for new technologies

When asked about the medium term, six of the interviewees saw a significant role for tablet and 1:1 technology solutions. Some of them have expanded this thinking to include the use of cloud based technologies and a bring your own device model. The focus on more open systems with greater external access to data will require planning and collaboration. It will also enable the breaking down of traditional learning boundaries and spaces, and students could 'find the family becoming reframed as a site of increased engagement of schoolwork while outside of school.'

(Selwyn, 2014:133). Underwood et al. (2009) report on the ways technology supports 'narrowing the gap'. Jones (2009) comments on the growing role of mobile technologies and links this with innovative practice, which is interesting given that this is one way in which schools could pass some of the costs of ICT over to parents and could prove socially divisive. Chowcat et al. (2008) explores the trends towards mobile technologies and link it with the arguments on globalisation and policy making. Chowcat reflects on the challenge posed by web technologies and a move towards customisation for the user rather than the institution. Hartnell-Young (2008) examines the role of mobile phones in this context. Condie (2006) points to the wide range of reports on e-learning. Cox et al. (2003) have a whole report on ICT and attainment in which they consider subjects cf. Crook (2010) and another directly looking at pedagogy Cox (2003b).

Selwyn (2014) repeatedly highlights the issue of social inequalities that can arise through the widespread use of ICT. This is particularly significant when considering BYOD, where there are almost certainly issues around different levels of access, different levels of engagement and different abilities to engage with information networks. A move to 1:1 technology does not offer a 'level playing field' (Selwyn, 2014:138) and is not a wholly free choice for those whose schools choose to go in that direction.

I asked as my sixteenth question, whether there were any pieces of technology that the school felt would have a significant impact over the medium term. The aim of this question was twofold: to bring out the technology that the different schools were investigating, and to look at the process that had been followed to arrive at these conclusions. In practice most of the interviewees tended to focus on the first part of the question and skip the latter.

Philip's school had already been spending around £22k on netbooks for their 6th form students. They had looked at bringing in iPads rather than netbooks, but 'we have the problem that they are not compatible with Facilitating Rapid Online Growth (FROG) VLE and it doesn't support them so that we need it to help students get access to the wider curriculum.' The school used technology, like iTouches, in lessons to video record and create images as well as access information. The netbooks were paid for by the school but they then allowed students to purchase the machines they had been using at the end of the year. 'The school insurance policy covers in school damage and we get them to pay a £20 fee to cover the netbook when it is out of school.' There was also reference in the earlier questions to money being saved in curriculum resources at 6th form due to the use of the netbooks, as these traditional PCs are easier to manage than tablets on a server without additional investment. Asked about the future Philip thought he could see a role for tablets,

> 'I think a lot of the tablet based stuff is quite exciting and it is looking like it might be a useful medium to bring into schools. You can study music from a textbook or you can play a flute or a violin or something of that nature... We have also used quite a lot of things like Photostory and Prezi in terms of demonstration and presentations and that has been very effective for students in terms of what they want to deliver and their understanding.'

Aware that Prezi works online, I asked about the problems of using web-based technologies in the classroom and we chatted about the vulnerability, in the current environment, of a web dependent medium. At the same time Philip could say, 'It is a different medium and a different form of presentation ...it allows them to dig into it and dig down a bit further as opposed to an

ordinary PowerPoint which is much more linear.' I probed into his existing use of netbooks, 'Are the textbooks on tablets just an electronic copy of a paper book (where the advantage is that the books can't be forgotten), or is there something there that is different?' He responded citing the use of the web for research,

> 'As a tool for research it is outstanding... The accessibility is vastly improved with the use of the tablet but there are other interactive things as work can be projected up at the front of the class, which gives immediate collaboration and immediate feedback. They also have exam questions and answers that they can be working on and they throw them up with a classic error and in terms of immediacy and that type of feedback it is very impressive.'

Philip seemed to accept that the drop in price of devices and their ubiquity in the wider world meant that the dynamic for learning was changing and students were beginning to expect a system that allowed them to access it.

The other school, Matthew's, that was also actively involved in using 1:1 technologies with their students said,

> 'There is a specific action research programme around the iPads and we have done other action research projects in the past and we have had those published... It is only after 3 years of investment that we feel ready to introduce the IPads due to the security of the system and the reach of the system. We have increased the technical support and the policy has always been to reach the point that we have a mobile technology that is available to the kids. Last year, the first step of that was IPods on a bookable basis and that has been evaluated and seemed to have an impact and so we are now at the next stage where we are looking at further use of mobile and handheld technology.'

Matthew agreed with much of Philip's response about the role of mobile technologies and his stress on the importance of not assuming that the IPad was the only alternative on the market. At the same time, he also reflected on the potential for two other types of technology: Augmented Reality within the school environment; and Apps designed for local purposes. He referred back to the rigorous system that the school had in place around assessing a new piece of technology by a peer reviewed research process. In relation to tablets he felt,

> 'We are at the first stage. We will use augmented reality and Apps for learning. We will evaluate them this year as to which we feel are useful and which are not. We will also end up developing our own with the 'Apps for Good' project. We have students involved in design both Apps and the website.'

While he didn't want to equate all tablet technology with the Apple product as the Android devices were potentially cheaper, the main factor in favour of the Apple device was found in this comment, 'At the moment the big problem that we have, is Android don't have the same quality control over the Apps that are available, as Apple.'

Luke also saw a huge place for mobile technologies, but he linked these with a much wider move towards online software licensing and virtualisation of the school infrastructure. The idea of transferring all school computing into a 'cloud' based solution offers various cost efficient ways of maintaining aspects of the school infrastructure. Luke could also see the convergence of mobile phones with tablets to create a device that was brought into school, rather than paid for by the school.

> 'We are not sure which we will go with, either Google Apps or Microsoft 365, but there is a huge potential for Apps and cloud based technologies; the next stage of virtualisation and the computer that every kid has in their pocket, with tablets and mobile phones... This will change the spending that we need to make as it changes the dynamic with every student bringing a computer with them at their expense.

He then reflected,

> The challenge is to educate them in the correct use of the phone. I have never had a problem with a student trying to make a phone call or a text during lesson, but routinely have used the calendar and camera functions on them to take notes of

> deadlines or a demonstration, or even your mate is not here so text him the work. It is all about educate them into how to use it sensibly.'

If schools, such as Philip's, were to adopt this approach, then it would open up where they could invest £23k, transferring it to other technologies, for example, a wireless infrastructure or augmenting the building.

In a similar way to Luke, Jean wasn't considering supplying machines, but saw the move towards wireless technologies as being around building the infrastructure to allow students to use their own devices. 'The major changes for us will be within the 6th form and the development of wireless technology which we are trying to put in place... This will lead to the use of wireless login to the school systems on devices like a phone.'

James also saw a shift towards wireless personal machines and the role of the home market in driving the demand for these devices. He spoke about the potential for augmented reality and the 3D technologies that are now being pioneered by Google amongst others.

> …'you have the shift towards smartphones and tablet PCs (either Android, Microsoft or Apple) and you can see that is the way we are going... Obviously there is an impact and schools need to make sure it doesn't pass them by. The students leaving us now will use the tablets as the base to go to the next stage... You can't just bury your head you need to realise how they are using them at home.'

Chowcat (2008) reflected on the challenge posed by web technologies. At least one of the

interviewees was struggling with these devices and making them fit inside a school infrastructure, rather than a domestic one. Emily could see the potential for iPad/tablet technologies and was trying to find a financial way to make this possible. She said, 'I think the tablets. We are doing a trial on the iPads... I think it will have an effect on how we manage the school, and also in the classroom, but it will be a long time for the classroom as we have invested all this money in the suites.' Seeing the desire to move towards iPads and the fiscal reservations at the end of this reply, I then probed further with the question, 'If you did provide iPads would it be a case of you providing them to students or would it be a joint investment with parents?' This brought the response that,

> 'I think it would have to be a joint investment as I don't see how we could afford to give them it school wide. Particularly, given the numbers and I see the budget for the next few years and there is a knock on effect. We might be low in September but that is doubly low the following year as those Year 7s become Year 8s and that puts pressure on the capital budget.'

This was a school in an urban area that had already indicated a downward pressure on its overall budget.

Luke was in a fairly middle class socio-economic context and could see parents funding machines. Philip and Matthew were both engaged in projects where the school was committing funds and allowing features like a parental purchase scheme. James and Emily were having to be inventive, by looking at co-funding models. While others like John who were in a less advantaged position, simply said, 'We are looking at iPads as the next big thing.' I had already conducted a few

interviews and was aware of the difference of view about how they could be funded, so I asked 'Who would pay for them? How are you going to afford them?' The reply was, 'We will and we don't know whether we could get to the situation where we would provide everyone with an iPad. We would be looking to provide more opportunities with things like class sets.' This posed a different prospect of personal devices being used within a school as bookable resources, similar to the way that iTouch were being used in Philip's school. This type of use created a completely different dynamic in terms of how they could be used within the classroom, but perhaps this was the only alternative in some school economies.

Peter was also in an urban environment which was not socio-economically advantaged. He said, 'I would imagine that the biggest development is going to be handheld devices, in whatever guise that might be. Lots of schools are using mobile phones.' I followed this up with a similar question to that I asked John, to see whether he envisaged a co-funded model or an outright purchase, asking, 'Do you think that is because it is a way of moving the costs from the school to the home or sharing the costs?' Peter replied,

> ‘I could be cynical and suggest that, but clearly I am not in that situation. Our students have phones that are not smart phones. They are often very basic and that would be a limitation in this school. Handheld technology is going to be a big area with the money that Windows and Samsung are ploughing into those areas. It is one reason that we are hanging back. We seem to spend our lives hanging back because we don’t want to miss out on the new thing or the thing that could be better. We are quite conservative... We want to be in a position where students are taking things home and interacting with the wireless technology provided by people like [*a local housing provider*]. Wireless technology is moving forward at a massive pace both at home and in schools.’

We have already seen that Peter’s school was running a pilot with a local housing provider to support a free wireless signal provided across the local area. He saw the huge benefit that this could provide to students from less economically advantaged backgrounds.

This leads me to the finding that there is a significant amount of interest in the use of tablets and other personal computing devices across nearly all the schools in the study. However, a personal device for each student, when they couldn’t rely on parental support with the funding, would be a significant challenge to any secondary school in the current fiscal climate. The challenge remains in how to provide an education system that seeks to allow equality of access and mitigate against social inequalities, while allowing schools to embrace a BYOD solution that unleashes a range of deep learning and gives a buzz to every classroom (Fullan, 2014:148).

Conclusion

As we examined, in the first sub-section, the participants accounts of the way in which their schools made budget decisions, it was important to remind ourselves of the broader context. Buckingham (2007) comments, 'the idea that technology in itself would radically transform education – and even result in the demise of the school – has been shown to be an illusion.' (2007:177). However, technology occupies a major role in the lives of most young people and there is a real clamour for it in many schools from parents. It is important for schools, in the modern British education marketplace, to purchase equipment that is seen to be contemporary. Yet, as we saw from the Dystopian section of Chapter 3 we have few teachers who are making innovative use of it within the classroom.

In the second sub-section we saw that In the face of reducing finances many of the rural schools had not been as significantly affected and were investing in technology that was likely to cut their overheads in the medium term, or outsource some of the cost of equipment by the use of tablets. In the third and fourth sub-sections we examined the role of the local leadership team in developing spending on ICT. When challenged about gaining value for money there were differences across all the schools. Some saw this in quantifiable financial terms and others viewed it instead in a qualitative experience that made a difference in the lives of their students. John, a headteacher in the study, regarded the wider objective of school as 'improving the life choices of your pupils'. For many of those in the study, technology played an important role not just in monitoring and controlling the 'inputs' but in developing young people that could achieve and succeed in a computer centred world. The rhetoric around globalisation and an information society ran throughout many of the responses. John reflected the sentiment of the other

interviewees when he said that,

> 'Schools have to be responsive to [the views of government] and I think what schools have always tried to do is to make those initiatives work for the pupils that they have got. Governments often come up with the broad idea, but when it comes down to it we are the ones that have got to make it work, and I think to be fair to education that we have often made it work and we shouldn't be reticent in recognising that fact.'

In the fourth section we saw how the Edutopian narrative had embedded itself in the thinking of the leaders and, in the fifth sub-section, we saw the challenge of creating a vision that is affordable, pedagogical sound and appropriate. Many schools were encouraging bring your own device schemes and 1:1 technologies. For Edutopians, like Fullan (2014), this is full of possibilities around opening up schools to allow for learning outside and beyond the traditional classroom. Dystopian thinkers, like Selwyn(2014), would critique this 'total pedagogization' of society and the 'always-on' access that is presented as extending choice, but can exacerbate forms of exploitation. 1:1 technologies carry promise and the danger that individuals feel compelled to engage with them regardless of how appropriate that is and to the detriment of other aspects of their lives.

Chapter 7 - The potential for ICT in schools

Introduction

In the previous chapter, I picked up the second theme around what processes and priorities are used by leaders. In that chapter, I focussed on the priorities of the senior leaders in the sample. In this chapter, I want to consider the processes around the use of ICT, particularly: the use of data; the perceptions of success on ICT projects and the links to processes associated with this; the perceptions around value for money; and whether any of their experiences or views are coloured by local variables, such as the availability of technical support?'

BECTA suggests that various factors affect the perception of the success of ICT within a school. Crook (2010) examines the successful uptake of ICT and identifies the following factors: leadership, a learning platform, staff development, and versatile learning spaces. Jones (2009) provides a series of case studies across a range of institutions to examine factors behind the adoption of a range of technologies. The BECTA (2007) review notes that at that time the secondary school average of pupils to machine was 6.2 and that over 95% of secondary schools provided laptops to some students for use in learning. The same report points out the issues that schools are facing about replacing ageing laptops. Jones (2004) indicates that levels of access to ICT are significant in determining how often they are used by teachers, cf. Mumtaz (2000), but he notes,

> ‘It is not necessarily the case that a school with low access does not have enough equipment; it may be that the amount of equipment is adequate but inappropriately organised in the school. Equipment should be organised in such a way to ensure maximum access for all users. (Pelgrum, 2000; Fabry and Higgs, 1997).’ (Jones, 2004:3)

The availability of equipment and ease of access are factors that influence the perception of a strong ICT system. The Jones’ review on the literature around barriers for uptake of ICT by teachers highlights several key findings and (2004:3) points to individual confidence and inappropriate training styles being deployed by schools as something highlighted in various reports. Similarly, the issues of time to prepare and research lesson materials were other major factors. He has a key barrier as the availability of personal access to ICT, (supported by Ross et al.,1999; Cox et al., 1999; and Guha, 2000). The effect of the provision of laptops for teachers is discussed by Cunningham (2003), and the multiplicity of change brought by that single innovation. Ensuring the maximum availability and ease of access are issues in maintaining a sustainable ICT environment.

Processes around the use of data in schools

Hollingsworth et al.(2008) commented that from a survey of 181 schools, 82 per cent had supported the view that technology played a key role in their improvement. In the schools within the study the uses of technology included: an increased use of information systems for monitoring and analysing learning achievement and progress; the development of IT systems for monitoring attendance and behaviour (lesson registration, behaviour systems and parental

alerting); the improved use of technology to engage under-achieving pupils, particularly in the areas of creative and applied learning; and the development of systems for supporting pupil voice through online surveys and forums.

The New Labour government invested heavily in education and in a range of educational organisations that monitored progress. BECTA (2007) looked at the use of e-registration systems with 86% of secondary schools using a system and trying to link this to a form of parental reporting. The school effectiveness group saw the importance of data in understanding schools' performance and a variety of models and organisations were developed around CVA, the Fisher Family Trust and Jesson model. The OFSTED framework under the New Labour government trumpeted teaching styles and lesson formats that were considered successful on the basis of the data and this encouraged a fairly formulaic approach to lesson delivery. The OFSTED regime then began to change, with the chief inspector saying in a speech,

> ‘For me a good lesson is about what works. A good lesson is about what works. So this is a plea, this evening, for pragmatism not ideology in the way we judge the quality of teaching... We, and in that word “we” I include OFSTED, should be wary of trying to prescribe a particular style of teaching, whether it be a three part lesson; an insistence that there should be a balance between teacher led activities and independent learning, or that the lesson should start with aims and objectives with a plenary at the end and so on and so forth. We should be wary of too much prescription. In my experience a formulaic approach pushed out by a school or rigidly prescribed in an inspection evaluation schedule traps too many teachers into a stultifying and stifling mould which doesn’t demand that they use their imagination, initiative and common sense.’ (Wilshaw, 2012)

The OFSTED inspection framework in 2012 still expected schools to provide a range of data. In an inspection they,

‘use a range of data to judge a school’s performance, including that found in RaiseOnline, and examination or key stage results where available. No single measure or indicator determines judgements. The data, including that provided by the school, should be used to:

- check the accuracy of the school’s assessment of pupils’ progress and attainment levels, particularly where there are no externally marked test/examination results
- check the robustness and accuracy of the school’s self-evaluation, particularly on achievement, teaching, and behaviour and safety.’ (OFSTED, 2012)

While there were differences in how schools in the study benefitted from ICT affecting pedagogy or in the way it worked within their learning spaces, all the schools were heavy users of ICT for data analysis. Heslop (2007) identified various benefits that technology offered to schools and he started by observing that technologies only really offer a faster, better organised and more assessable form of a paper folder, but added, that the use of ICT allowed leaders to see something new when it came to data as it highlighted inconsistencies and helped in the setting of targets.

Matthew said, in relation to his data management system, that they realised that they needed to recruit a data manager and ‘we have been lucky enough to recruit someone with a Ph.D. who is a good source of advice and is reliable, and is vital to not just the technical team but the curriculum team and he supports the assistant principal who has responsibility for producing data.’ At Jean’s school they employed a member of staff who was responsible for data analysis. This allowed the

school to interpret and examine the data that was provided by central government. This data was then used in the school self-evaluation documents, which in turn drove the school improvement processes. In this study, there was a reasonable majority in favour of the significant use of data analysis in driving the whole school agenda. However, another major factor was the contextualisation of the data by the leadership team to form a wider non-data driven view of their priorities.

Emily was more unclear about how integral the use of data was and seemed to suggest that the current approach relied heavily on professional judgement within the leadership team. However, instead of defending this approach she was resigned the fact that it would soon change. Emily said, 'in the main they are set [the school priorities] from what we need to do from a qualitative perspective, but I think there will be a change with the new head teacher. A person coming in will probably be driven by a more data point of view.'

John's reply also indicated that they used the reports from government to identify areas of whole school focus. The use of the data reports to build an accountability framework that conditions the internal debate on improvement and spending is a feature that will be developed in the next chapter. The use of a wide range of data in an accountability framework is something that appears to be at the heart of the approach of the Coalition government.

Philip saw the centrality of data analysis in measuring the objectives of the school.

> 'Our biggest one is assessment for learning to support learning as a school. We are looking at the monitoring of students' use of data, particularly from KS3 (the start) into KS4 and into KS5. What had been happening was that we had the tendency to focus on the headline exam figures and what we had not understood was the key measures of progress in terms of achievement were being missed out. We get good attainment figures so for us the main thrust as a school is to improve the assessment side and tracking students and how they are performing and that means we need to have a really robust tracking system and that is what we are currently working on with PARS and SIMS.'

This response reflected a school that were eager to use data intelligently to go beyond the key measures and use the internal systems to track and intervene with students. It also showed the arbitrary nature of some of the reports from RaiseOnline which have tended to focus on achievement in each Key-stage where a secondary school should probably be more properly judged on its KS2 to KS4, or even KS5, progression. Matthew saw the role of the leadership team as interpreting the data and then using it effectively to intervene to improve teaching and learning.

> 'Everything in school serves the quality of teaching and learning and it is about every hour of every day serving the children's experiences and each teacher needs to be secure in their skills and ability to find information and using information and using ICT as a collaboration tool or a delivery tool. All ICT serves that point of delivery in the classroom.'

The focus on ICT as a method of improving tracking and intervention for each child was at the heart of his response and this reflected an embedded approach to the use of data within a school. Matthew's emphasis, on the importance of each teacher to improve the quality of teaching and learning with data, is supported by good school level CPD. The systems and the techniques for using data often change between schools. It is important that each school trains its staff in how to use these systems effectively.

The trend towards using data to support an increased independence in learning in many schools was also found in John's response to this question. He identified a school priority as narrowing the gap between girls' and boys' performance, and could see that 'data has clearly had some effect on it.' Unsurprisingly, this data had been monitored after the initial focus had subsided and then, he said 'we have noticed that it is now beginning to widen again.' Another school priority was to increase the number of A/A* grades that the gifted and talented cohort at the school were attaining. He saw that this improvement depended on the quality of teaching and learning that his staff would deliver with those able students. He added that it was also affected by,

> 'how we can use technology with them, which is all about independent learning, which I think is something that as a school with the drives for exam results, we have lost independent learning and have tended to spoon feed them. I don't think in the long term that spoon feeding the brightest students is the right answer and we have lost something very important with the absence of a stress on independent learning.'

John's response contained the free access to data as a means of monitoring and challenging

underperformance. It also rested on the use of ICT as a learning tool that could diagnose students' own weaknesses and challenge and extend their thinking.

Luke's response also highlighted the centrality of data analysis and how its intelligent use was at the heart of the changes they were making pedagogically. Again, Luke saw the importance of these being supported by a range of training opportunities. He said,

> 'Our key priority next year is independent learning. Instead of INSET days we run Twilight sessions and independent learning will be the focus along with ICT. It will give me an opportunity to push still further the changes, and the way I want the VLE to be the starting point, and I want the parental portal to be used more, and I want routinely lessons to be based around the VLE, and I want all homework to be set on the VLE with all communication going backwards and forwards to be through the VLE.'

Luke felt that independence in learning would be at the heart of the next stage of his school's improvement and he saw ICT, and freer availability of data, as the enablers in that process. The use of ICT as a facilitator is found in its ability to target specific resources and rapidly to identify pupils needing additional intervention and support.

Peter saw the role of data as something to frame the conversation between the school and the parents. His focus with data was to develop the relationship with the home environment. He would say 'We are behind schedule on where we wanted to be on the relationship of parents and the school, but I don't think we are on our own in that respect.' He would also link some of this to

retrenchment results from ‘reduced finances’ in his urban school.

> ‘the parent portal has been one major thing that the government have tried to put in place but it isn’t mandatory anyway and we haven’t really had that up and running properly ... at the moment what we are trying to do is to keep the current system up to date rather than continually adding more to it because the cost is preventing that.‘

This emphasis was also found in the response of James, as they sought to use data more intelligently on a local level to track a pupils’ progress through each stage of their development. He said,

> ‘The key priority is the school’s interaction and links with the wider community. There is a consultation within [the town] on the [town] learning corridor and it is supporting the whole of [town] and the wider community. ICT lends itself to this type of support. All the students have smart phones etc. But so have the parents, businesses, the library and the wider community, so the question arises how can we integrate with all of that?’

This leads me to the finding that data remains central to the setting of school improvement priorities in the schools within the survey. Schools are moving towards a more open approach to the use of data to examine all aspects of their performance and to develop bespoke rather than generic solutions.

It was interesting that none of the schools in the survey chose to cite examples of the use of ICT to support administrative functions around data analysis being integrated into a part of their on-

going staff CPD programmes (suggested by Condie and Munro (2006) as an example of good practice), although, I suspect that Matthew could probably have done so if he had been encouraged to continue.

The success rate of ICT projects

The study had two questions around successful and unsuccessful purchases and they were important as they asked the interviewee to reflect on why an innovation had succeeded or failed. The innovations themselves were interesting but it was much more useful to understand how the processes around the purchasing decision had affected its success. A clear understanding of the structures around a successful innovation, or the features of a failed idea, are likely to help decision makers to structure future planning and activities. There were some examples of strong practice, like that of Matthew, but many others were dependent on the personality of a single individual.

Matthew was happy with most of his procurement decisions. This reflected a fairly strong procedure that spread the decision making across several personnel at different levels within the school, involving a network manager, a director of e-learning from the senior team, and a head of ICT. He explained the inter-relationships in the policy,

> 'every innovation has a purpose that is then reflected on and reported on... There is a technology (e-learning) development plan that sits within the system with measurable outcomes and is monitored by the governors in a normal fashion, like any other initiative. We have a rigorous set of procedures in place. Over the last few years we have increased the reach, depth, quality and speed.'

It meant that he could look back at various investments as planned steps in an on-going process, which were the right decisions at the time. When asked about an unsuccessful spend, he immediately replied that 'There is nothing that springs to mind. I am pretty comfortable with what we have done.' On the unsuccessful question he wanted to reflect instead on the length of time they had from each innovation, and similarly on the successful question he commented on a range of sequential initiatives. They had bought laptops for staff 'which was beneficial and raised morale and had an impact in the classroom', but had then migrated to an introduction of electronic whiteboards which then led to the attachment of PCs to these in many classrooms. At the same time with their role as a teaching school, they were eager to work with staff to provide both training and support for research to investigate the potential of technologies. Matthew understood the range of factors that contributed to the successful implementation of ICT and this appeared to have borne fruit within his school.

Philip felt that an investment his school had made in netbooks for the 6th form had worked. This was because it had moved forward teaching and learning and "attracted kids into the 6th form or made them want to come back into the 6th form." This whole school investment was financed predominantly by the school, with the home paying for the insurance policy and having the option of purchase at the end of the course. However, it was clear despite the positive impacts on pedagogy and on recruitment that the decision had knock-on effects on infrastructure that still needed to be resolved. Philip said, 'the Wi-Fi system is slow but when you have 221 netbooks at the same time then it is going to be slow.' This comment would point to a need within Philip's

school to tighten some of the systems and advice around assessing the quality and services needed to support investment which was identified as a part of the BECTA (2006b) list. In the same list for assessing a sustainable strategy, BECTA (2006b) identify 'impact of existing provision and practices on staff (and possibly pupil) satisfaction, confidence and competence' and 'challenge assumptions about the quality and value of current technical support services and practices.' Philip had shown leadership in post by reassessing the quality of services that had been purchased by his predecessor and he was clear that the least successful spend was down to a lack of consultative leadership and a failure to challenge assumptions in relation to technical support. This pointed to a local procurement process that was heavily dependent on the views of a single individual and which, in this case, had failed to consider adequately the alternatives. Philip commented in relation to the purchase of an administrative piece of software for providing data to parents that, 'The front look of it has all to be done by an internal technician' and that the link to the data system was a 'nightmare.' He summarised this failing with 'we spent £22k on it and it was a three year contract and we just wasted that money. We never got it running properly or could utilise what it was supposed to be able to do.' This highlights the importance of all schools being prepared to review their procurement processes and challenging decisions to ensure that they are receiving value for money.

The research of Younie (1996) pointed to a problem in the links between levels of provision in education. Sadly, it seems that this is still an issue within the new localised structures. Luke had to impose change with his VLE, and this demonstrated the problem of leading a change that seems right to those in a managerial position but is not widely welcomed by the staff and student base. It could highlight issues with timetabling, training, understanding of the pedagogy, curriculum

demands or professional insecurity. Luke showed a visionary leadership style. He had ‘spent quite a bit of money’ on video conferencing and had ‘been let down by the local authority in terms of pinch points in their provision.’ Luke challenged the authority provision, giving a clear pedagogical rationale and asked for answers. He added, ‘you have to challenge them all the way and they are in a competitive market’. The difficulty in leading a successful change appears to have a degree of dependence on the ability of the leadership team to measure and drive the attitudes in school and in the wider community.

John felt his most successful ICT spend was a laser cutter within D&T. He said, ‘it has made a massive impact to the quality of the outcomes that the pupils produce.’ The investment was pedagogically and institutionally sound as, ‘it has had a marked impact and has been a motivator for pupils, and has transformed the team.’ At the same time, John concluded that this investment was also successful because of personnel changes; the ‘appointment of a new member of staff has transformed that area and it has transformed it.’ In this environment the process around the successful change was not a centrally led shift, but the ability to support a pedagogically sound change that was being driven from within the curriculum team. John felt that his least successful initiative was the introduction of interactive whiteboards and the reasoning he levels is directly supported by Crook (2010), Younie (2006) and BECTA (2006b). He said,

> ‘to be fair to staff I think that [the failure of the whiteboards] is because we didn’t have the training running alongside at the right level and at the right time. And now we have addressed that but I think it is not something where I would necessarily say don’t introduce interactive whiteboards, but I would want much more in terms of proving to me how you will use them.’

I probed this response and questioned whether he thought that interactive whiteboards were dependent for success on which department they were in, and by implication that this success didn’t depend on a management process but a pedagogical reason. John disagreed and reasserted the role of training in the failure of the initiative,

> ‘what we tried to do was to get a member of each department that was really keen, and there are now a lot of staff who use it, and use it very effectively. We have other staff where we need to get our training to meet their training needs and we didn’t quite get that in synch and I think we have improved that.’

It was refreshing to hear a head teacher accept his role in this failure of the initiative and reflect in open terms about the importance of staff training to ensure that his team understood what he was trying to do.

Jean chose as the successful initiative the introduction of PCs into each classroom for the effect that it had on linking attendance, behaviour and reporting systems. This procurement is more affordable that many of those cited by others within the study and its success concurs with the views of Younie (1996) on the importance of technology that supports assessment. She hinted at a previously unsuccessful change that had brought them to look more critically at the technology

involved in this initiative, ‘we went for networked machines rather than wireless machines as we had previous experiences of BromCom.’ When questioned about the unsuccessful development she pointed to ‘Citrix for our remote access’, as ‘initially it didn’t meet the expectations we had for it and we challenged this.’ This would suggest that, on the BECTA (2006b) framework, they have work to do on assessing the quality of facilities and services needed to support the ICT development, but that they are stronger at reviewing procurement and at reassessing the quality of facilities.

Emily reflected on a process of introducing laptops that had failed as it did not take account of the learning spaces and the pedagogy.

> ‘The first lot of ICT suites that we put in was a major shift in the school. We started off with laptops and wireless and it was in a ground floor room, and it didn’t work that well because we didn’t think about the right things, and eventually they got shifted somewhere else. But what it did do is made us concentrate on what we needed and it concentrated the teachers on this is the way forward now.’

They had problems with the laptop purchase and the wireless signal. This had brought a change where ‘we have gone to desktops for students.’ Emily added, ‘the wireless signal works. It was the laptops more than anything and we have gone back to fixed computers.’ The trend line here is directly opposed to that of Matthew’s school where the school had moved from desktop to mobile technologies. Emily was reflecting on a process that had not delivered the necessary

features with an aborted attempt to change to mobile technologies followed by a move back to the safer and more sustainable model.

The problems with mobile technologies highlighted in some of the previous answers centre in a process that focused on what was on the students' desk (i.e. the laptop or tablet), rather than on building a solid system that they could rely on. James reflected on an early stage at the school when they had been using cheap open source network software that was failing.

> 'We had a week when every single member of staff and students couldn't access anything and I have not had anything like such a horrible week in my life. Every morning at briefings I would have to tell staff that it was still not working. We invested the £45k in the holidays over the phone, and it has paid off because with support, and we have gone with VMWare and HP support, and we haven't had an issue with it, and it has been one of the best investments that we have made.'

James said that since then he had worked to create a decision making process that was in control and planned rather than reactive. In a similar fashion to others like Jean and Emily, James had been part of processes that had failed due to not challenging the robustness of the ideas at the outset. In each of the cases, the processes had sufficient structure to then allow them to amend this post-implementation. It is interesting that many of the interviewees didn't refer to issues like the mode of implementation, the style of leadership adopted, or the role of staff training, as significant points, when the literature review suggested these as a causal factor.

This leads me to the finding that there is an absence of a clear purchasing process and a lack of internal research behind decisions taken within the schools in the county. The variety of practices around purchasing and implementation lead to money being spent on projects that are less successful than anticipated.

The problem areas Younie (2006) identified were: management of initiatives; funding disparities; technology procurement and sustainability; ICT training and impact on pedagogy. Crook (2010) highlights the following factors as those that are significant: leadership, a learning platform, staff development, and versatile learning spaces. I did not expect the interviewees to blame themselves for failures with initiatives but I hoped to identify any failures from their responses. Younie (2006) pointed to the multiplicity of agencies involved in funding and buying decisions and found that many of the New Labour initiatives were,

> 'exceptional in scope, challenging and complicated, requiring an expertise in management that largely wasn't there' (Younie, 2006:389)

In addition to these broader failings, she agreed with Crook (2010) on some of the key micro factors,

> 'Implementation within schools was multidimensional and required an understanding of the relationships between procuring a robust technology infrastructure, teachers' ICT training, and curriculum and assessment demands.' (Younie, 2006:389)

Younie commented that the New Labour strategy necessitated change on multiple fronts; some involving the schools directly and others working with government agencies or outside bodies. It

created an environment that was complex where school leaders lacked ICT expertise and were not able to be able to locate this knowledge elsewhere. It was not surprising that schools' ICT plans were often weak and struggled to juggle the demands of finance, procurement, timetabling, space, training, curriculum and assessment demands.

It is important in our current environment where the role of school leader is more isolated and more open to an accountability framework designed to 'raise standards', that we develop processes around handling these variables. Jones (2009) found that in his five action research projects there were two common characteristics: the presence of technology champions, and a range of leadership support. These were not extensive in the thinking of the leaders within this study.

BECTA (2008b) pointed to a range of factors that affected the uptake of ICT by boys and girls. There had been a pattern under the New Labour administrations of spending money on ICT as a means of making learning more 'boy friendly'. ICT was thought to make ideas more immediate, interactive and based in real life. The study (BECTA, 2008b) highlighted that many girls had a reduced level of access to ICT at home compared to boys, and that girls' use of ICT outside the classroom was generally study related, whereas boys used it for leisure purposes. Girls' use of ICT tended to be impacted more heavily by the socio-economic background, and females were inclined to prefer the creative and social side of ICT. The study showed that girls made more use of mobile phone technologies and they were more likely to be involved or subject to cyber bullying. Equally, while there was little difference in the skill level of boys and girls at an early stage, girls' interest in the use of ICT tended to reduce through school. There was evidence of

ongoing gender stereotyping that impacted on girls' attitudes. This literature backdrop could have a bearing on a particular innovation if it relied heavily on a gender loaded factor, such as, the introduction of a competitive aspect which would appeal to boys rather than girls. The Passey (2004) study supported the findings of the BECTA (2008b) report that some technologies, such as, electronic whiteboards were gender neutral in their motivational effect. BECTA (2008b) thought that mobile technologies were more popular with boys than girls as a motivational factor. However, whether this was correlated with a technology with a social side to it is uncertain in their report.

Value for money

The lever that the Coalition government applied to schools was through a rigorous accountability framework in terms of the outcomes that were tested through the examination and inspection processes. Younie remarked that a feature of the approach adopted by the New Labour government had,

> 'a discernible lack of ICT expertise and cohesive, 'joined-up' thinking across different strata and agencies, and even within schools, as one stratum. For example, just within schools, leaders had to juggle the difficulties and demands of financial contracts, technology procurement alongside timetabling, spacing requirements, ICT training for teachers and, curriculum and assessment demands.' (Younie, 2006:397)

She would add regarding her own study that,

> ‘One key lesson learnt concerned the need to contextualise national strategy to meet local needs of specific schools and teachers who may be operating in very different conditions – ICT rich or poor, depended on the varying levels of finance, provision and leadership expertise in each given school.’ (Younie, 1996:399)

While, one might hope that we had learnt from the lessons of twenty years ago and the roll out of a strategy at that point, the same factors seem to be reappearing in this study. I would hope that one of the aspects that might be beneficial is an understanding of how the different schools in the study judged whether or not they were receiving value for money. As BECTA (2006) point out the LEA has been a particularly valuable support for many schools in collating cost data and comparing their strategies. The last few years have seen the academy programme having a significantly negative effect on the ability of LEAs to supply this type of support. It is useful for school leaders to be able to compare their processes around evaluating costs and other figures associated with creating a sustainable infrastructure.

In the then current political climate my ninth question, about ‘how do you know that you are getting value of money in your spending on ICT’, was potentially a loaded one. Decision making and finances have been increasingly sent to a local level with the assumption that each school will guarantee best value in its own way.

Luke gave a clear financial answer and explained his process around procuring best value for money from suppliers. This financial process, which perhaps had drawn on Luke’s industrial

experience, is one that should be more rigorously applied across schools. In my own experience, the ICT leadership in most schools don't challenge costs from suppliers with much vigour, and this results in them paying much more on some contracts than neighbouring institutions. Luke's methodology was,

> 'Getting value for money is hardwired into this establishment... It is just hardwired into us. I am absolutely confident that every single spend that we make in ICT gives us bang for our buck. When we get down to the last two, then we do a Dutch auction and we compared what one would provide against the other. When you get down to a particular point then you know how hard you are squeezing them. The mark-up they make is not on the server.. it is on the service at £850 per day.'

Jean gave a predominately financially based answer. However, at the end I was not left with an impression of a clear purchasing process that was being followed, or how the purchases fitted into an overall strategy. She said, when asked about how she knew she was obtaining value for money,

> 'Does one ever know? Technology is always moving and, so we bought projectors a couple of years ago for most of the classrooms, and now most of the equipment being offered for sale is lamp-less. Three years ago we were buying equipment with bulbs, and we can say that we bought what was best at the time. You only know what is best at that particular point in time.'

As a senior leader, Jean depended on the advice of her technical team and her focus tended to be on balancing the demands for equipment and judging the likely end results of the various claims for investment.

Matthew's response showed a process that was judged by its effect on teaching and learning. It also demonstrated a clear process that would generate the evidence from which a decision could be made about the usefulness of the technology. The clarity of thought in the response is useful as it linked the mechanism with the structure of what he was trying to achieve. He said that he knew that he had value for money,

> 'From the evaluative process that we go through, action research, student voice, parental survey. You ask if it is meeting the agenda of teaching and learning that you are trying to achieve and that relates to Bloom's taxonomy – ICT is very good at doing the lower level stuff about improving presentation and increasing engagement but then you don't use it to its full potential with the synthesis and analysis bit that we are interested in and that is what we have established with the innovations projects... If we are at the end of the 12 months, we want to see it enabling higher level thinking and higher level collaboration and if it does that, then that is what we are looking for it. If it doesn't do that then we will reflect and move on.'

John's focus was on teaching and learning and it was being assessed in a qualitative fashion that considered the results from each subject and then sought to determine the success factors behind the improvements. This type of approach depended on the type of leadership within the school

and its ability to filter the responses that they had from the subject departments themselves, as there was no clear evidence of a process that was being followed. He had gain 'value' from a spending on a laser cutter in design technology because of the difference it had made to students' results. Similarly, he saw a 'value' in the use of video technology in science to record students' thoughts.

Peter, like John, didn't appear to have a quantitative process for assessing the impact on teaching and learning and it seemed to be a subjective decision based on targets and criteria that were negotiated with departments. He said,

> 'Obviously at the end of the day it comes down to being able to demonstrate. Heads of faculty can demonstrate that the eight Macs in Art are delivering some outcomes that would not be there without those machines…This allows us to quantify if it is value for money. It is a grey area as I can't put my hand on my heart and say spending money on ICT is giving is better outcomes or better value for money. There are some pockets in school where I could say that, but not as a whole school.'

James, relied on his own instincts to know whether or not a quote was in the right order of magnitude for a major school project. His industrial experience would equip him with this instinct and the ability to pressure a supplier. He talked about the 'importance of a budget' and disparaged the approach that bought equipment carelessly as 'it is not really our money.' As previously mentioned he was critical of the effect of 'sales people within the ICT industry'. This encouraged me to ask him about his personal process for challenging costs. On teaching and

learning measures he seemed less sure and even said, ‘it is very hard to measure’ and detailed a multiplicity of issues and ways to assess them. He used qualitative indicators such as,

> ‘it is very hard to measure. How do you really measure the value of the computers and the impact on teaching and learning? You can go back to fundamentals… How busy you are. How innovative staff are being. How many questions they are raising. How many times they are asking can we just do this.‘

I asked about his procurement process and said, ’If you are doing your wireless project and you get a quote, how do you know that the quote is about right?’ James reflected on a mix of personal experience and the use of Edugeek, which is now the main mechanism for sharing information amongst ICT technicians across the country. On this type of ‘value’ measure he spoke in more quantitative terms,

> ‘There is the basis of the fact I have been working in ICT for 19 years. You can’t rely on that. Every supplier I went to last year, 3Com, HP and Ruckas were all coming back with a quote of around £10k.. You then start the research, and the key thing is to talk to others that have the systems in. So many times in education we re-invent the wheel and everyone is doing the same thing. I spoke to people on Edugeek... How do you know that you have not been ripped off? I guess it is gut feel, educated gut feel based on research.’

In addition to the two clear measures of the quantitative financial indicators and the qualitative teaching and learning indicators, there were those who were aware of both sides. Emily, who had

a non-educational background, looked at the question from both sides. She said,

> 'There is obviously the three quotes at the basic level... You can do it on a purely financial level but obviously it is far more than that. Clearly, we have to do the right things in terms of ticking the boxes but it is that effect in the classroom and the delivery for the teachers as well, and helping them, in preparation at home, with whiteboards and ease of delivery.'

In her responses she reflected on the role of ICT in marketing the school and seemed to have a perception of its role with OFSTED, in a comment about 'ticking boxes'. This element to the reply needs to be considered alongside her responses to the other political factors. Philip also provided an example of an answer that reflects on both sides,

> 'I know we get value for money in terms of the usage we get out of technology – that is easy enough to measure because you look at how much did you buy it for and how did you keep it serviced etc.. What is being used and what is being done on it... Another thing the ICT department have looked at is attitudinal surveys for the pupils to find on their view on their use of ICT, what have they used it on and what would they like to use it on.'

On these surveys he asked the question 'do you use ICT in lessons?' and the students' answers focused on ICT as it related to them, rather than the use by a member of staff. He added,

> We know how ICT is being used from observations and we know that it is going on all the time – and some of that is anecdotal, some of it is attitudinal, some of it is the surveys, some of it is observations, some of it is the traffic. Is it value for money? If it wasn't there would we need it and could other ways be found around it? Possibly.

What is interesting in this answer is that the financial process is judged quantitatively and he has also introduced measures for basing judgments on teaching and learning on figures gained from work with pupil voice. This leads me to the finding that, there is no standardised approach to the idea of value for money amongst the secondary schools and academies in the study. The approach varies in both style and outlook.

Overall, some interviewees responded in terms of outcomes for students and others responded in purely financial terms. This dichotomy in the responses was natural given the dual nature of a leadership role within schools: at one level it is altruistic and about doing your best for the students, and at another it becomes about managing a large institution effectively. In each of the groups of answers, there were those who responded with a clear quantitative factual process and there were others who responded with a more qualitative subjective process. This reflects the division in the section on methodology and the division between the approaches was something that I was immediately conscious of when I transcribed them.

Technical Support

BECTA (2008:12) identified the management of ICT as the only area that was self-assessed by interviewees as being established and notes strengths in providing an effective technical infrastructure with adequate connectivity that keeps data secure with the minimal risks. While, BECTA (2007) identified technical support as an area of challenge for schools to provide a cost-effective service, and Scrimshaw (2004) commented on the importance of reliable technical support and that, where this happened centralised coordination was important.

The Jones' review of literature about barriers for the uptake of ICT highlights several key issues which affect its uptake within the classroom. Some of the factors he identifies, such as 'a lack of ICT focus in initial teacher training', lie outside the scope of this study. Others, such as lack of hardware and poor organisation of resources, can be judged from broader responses. In the study he devotes an entire section to the problems caused by 'technical problems.' He divides the technical problems into two areas: firstly, the fear of things going wrong and secondly, a lack of technical support. He comments,

> 'A real concern for teachers when considering making use of ICT is the fear of equipment breaking down in a lesson, or that if they use the equipment they will do something wrong and cause damage to it themselves. In fact there are strong links between the barrier caused by a fear of doing damage to equipment, and the barrier caused by a lack of teacher confidence.' (Jones, 2004:15)

Jones adds to this, in the second of his areas with,

> 'Another barrier originates from actual breakdowns of equipment, and the subsequent disruption that these can cause. If there is a lack of technical support available in a school, then it is likely that preventative technical maintenance will not be carried out regularly, resulting in a higher risk of technical breakdowns.' (Jones, 2004:16)

An under-investment in, or a poorly performing technical support section within a school has a variety of impacts. If a member of staff is eager to use the equipment but lacks confidence, then the absence of support merely exacerbates the problem. Similarly, when members of staff don't want to use the equipment and don't see a potential for it in developing their teaching and

learning practices, then the absence of support acts as a rationale for their own inaction. Even when members of staff want to use the equipment and have the ability to integrate it into their teaching and learning, then issues can easily arise around the use of their own time to maintain equipment rather than provide teaching and learning experiences.

In the BECTA (2006) summary they point to staffing for support in many secondary schools as accounting for around 62% of their total cost. They added,

> 'Staff not employed in technical support roles in both primary and secondary schools spent around 30 minutes per week on installing IT, fixing problems and carrying out related administrative tasks (for example, loading paper in printers, backing up data or clearing disk space).' (BECTA:2006: 5)

This is a management issue and a problem should be identifiable in the way in which interviewees spoke about technical support. In the pilot study, I found that this issue tended to polarise interviewees into two distinct groups: one group were delighted with the quality of their support and felt that they were helpful and cost effective; and the other group thought the opposite. The latter position easily arose from domination by a single personality who couldn't understand the pressures of the classroom.

BECTA encouraged schools to consider if staff needed to supplement the technical support that was provided and why this was taking place. They noted the danger that technical support issues were often hidden from key decision makers, but were a significant cost to them.

> ‘The most striking feature of the project findings was that ICT support was by far the largest cost element of ICT budgets. Discovering that user self-support made up nearly half of the total support cost and was largely absent from budget planning was an uncomfortable finding for many project school leaders.’
> (BECTA 2006:5)

Given the backdrop in the literature, technical support merited at least a specific question over its quality and availability within the school. The pilot study had shown the degree of polarisation that could be expected in the response.

In Philip’s institution there was a network manager, a full time assistant and a part time assistant (as he was part time on the technical side and part time on the website and VLE). With two and a half full time staff, Philip felt that they were receiving a very good service at good value. However, when I probed about the quality of the experience for the staff, Philip hinted at a previous set of issues that indicated staff may have found them less than responsive. He said, ‘I had to take the team in hand. They weren’t working as a team.’ He added, ‘The network manager has a really good habit of rubbing people up the wrong way and can be abrasive and he has had to learn to temper that to change a few habits.’ One of the key ways in which Philip thought that he had improved the quality of the service being provided was the installation of a proprietary piece of helpdesk software called SpiceWorks. This allowed the technical team to allocate and track jobs

as they arose and to respond appropriately.

> ‘SpiceWorks enables us to manage the system a lot better. They know when there is something that is a complete class failure and they will go and support that immediately, but also if it is a printer that has run out of ink then unless that is absolutely necessary we don’t respond to that straight off.’

From a leadership perspective, a crucial aspect to the helpdesk software was that Philip could say ‘I can also see the jobs in SpiceWorks and so I can monitor the broad workload.’

Luke considered the sign of a good technical support base was that staff didn’t notice it. In his school they had spent money on technology that made it easier for the technicians to manage centrally or make the system more robust. Luke felt that his technical team were capable and appreciated by the staff. The school understood the importance of a strong technical support team and had invested in them by increasing their wages by one grade since the conversion to an academy. The school had a network manager, a technician and a web technician, although I didn’t ask Luke the exact number of technical staff in his team.

John, who worked in a smaller school than nearly all the others in the study, still had a network manager and a technician. The level of support complemented the amount of spending that the school was doing on hardware. He was happy with the support from his team and said ‘I think they really complement one another.’ The school had followed a model that had been successful in a variety of the schools in the pilot study. It had employed an apprentice simply for the

opportunity to train him up and then on finding that he was a strong employee they had kept him. John was meeting the network manager on a regular basis and this helped him to keep abreast of developments and issues within the school. He felt that the network manager was much more responsive to the needs of the staff and helped to support them to deliver. This was in contrast with other network managers in previous posts, who had struggled 'to get the message that staff are nervous using computers and needed to be looked after, right at that minute.' In John's interview, it was apparent that the school were investing heavily in ICT and had a real vision for its place within the school. The head teacher not only saw the relevance of technical support and how he wanted them to act but also made the time to understand the issues from their perspective. A senior manager meeting regularly with the technical team is not highlighted in the previous research material, but it seems to be good practice if it helps with a clarity of understanding around the issues faced on a daily basis. Scrimshaw (2004) supports this view,

> 'Whoever takes on technical support it is clear that for teachers and students to get a reliable and accessible service, cooperation between all parties concerned is required.' (2004:22)

At Jean's school they placed an emphasis on technical support and felt that their investment was being rewarded. She said, 'You can never have enough network support – if it is not running properly then it has an effect for all the staff and support teams.' They had an immediate team of four staff, with a network manager, a deputy manager and two technicians. This team were supported by other administrative staff with a total of seven people assigned to the broad area. This showed a very strong level of support, especially when it was set against the relatively low level of expenditure on hardware and software.

Emily's responses indicated that they had three technical staff in a fairly hierarchical structure. 'Besides the ICT manager, there is an assistant manager who does some work in relation to the website... We also have a technician who tends to work more in the classroom.' When asked how the staff felt about the level of support, Emily indicated that there would be a mixed response. 'They normally rate them' but this was adjusted for the current response probably being lower as they were spending time on planning a new infrastructure project. She then gave the example of a teacher asking for something loaded onto the system, and the job being ignored because it had not been seen as a priority. 'There sometimes is a bit of the tension there' and Emily felt they were caught between future planning and maintaining the day to day which indicated that the team were a little stretched, 'It is a fine balance and I know it is difficult.' Emily was also sufficiently astute to recognise that the teaching staff didn't always act in a fashion that was helpful, 'Sometimes teachers are not brilliant. They give it on the last minute... and say can you do that now – as if we have people in cupboards just waiting to do stuff.'

Peter was in a smaller school, which in a similar fashion to John, was very well supported and had three full time technicians. He thought that the dynamic worked well in the team, 'They are a fantastic team that work incredibly well together' and this was a due to a balance of both personality and age. When asked about the staff perception, he said that 'they are well respected' but added 'It has not always been the case' and that 'we have had to let people go in that area in the last twelve months who were not performing.' Moving on staff can be very destructive for team morale, or it can have the opposite effect. In this case it did seem to have galvanised the team around a core that worked well together whom Peter respected, 'They are nice people and

are easy to work with.' Perhaps, the movements by government to improve the rigour with which schools challenge underperformance needs to be extended from the teaching base to include all the support staffing. Historically, my own perception was that schools have been loath to challenge network support staff because of difficulties in recruiting talented employees. However, I think the current state of the job market, and the paucity of private sector opportunities, means that this problem has largely gone.

James was fairly candid, given that his role was directly linked to the support team and that he was familiar with the practice of running this type of team from his previous industrial experience. It was fairly average in size, with him and another three technicians. He said, 'We don't necessarily have the right people in the right positions.' and seemed prepared for a period of change. There didn't appear to be any robust system for tracking jobs firmly in place as he said that the team 'sometimes forget certain things' and that 'I worry if I was away on holiday for a few days, that we would have a problem.' One method of solving the problems he identified was to purchase external support rather than always relying on in-house support. At the same time, he had a clear view of the importance of response times, 'Fundamentally, you have a 50 minute lesson. There is no point having a four hour response time: if it is not within those 50 minutes then that is it – it is spoilt. You have got to appreciate that.' James understood the issues of support from a teaching and learning perspective and was worried about his ability to balance this demand.

The pressures felt by James, should be contrasted with the staffing levels at Matthew's school which was of a similar size and composition. Matthew had seven technicians working in a range of

roles and some of these were deployed in local primary schools. This service was sold to the local primary schools through a service level agreement that worked well and allowed for greater collaboration on ICT training. At the same time this environment was dynamic, 'there is a fairly high turnover in technical support and people can use it as a stepping stone to a future career.' This model was clearly something that James was interested in learning from, as in response to question 13, he had spoken about the importance of his school linking with the wider community and that ICT lent itself to this type of support. James had tried to approach his local primary schools with both support and an offer to pay for Microsoft licenses. This attempt had met with little success and, perhaps, there is something to be learnt from the ways that Matthew and James approached the respective schools and built the partnerships.

This leads me to the finding that most schools in the study were pleased with the quality of technical support that they were providing. However, most didn't have a system of measuring performance, costs and impact in this area. Sadly very few interviewees in the survey had quantified the cost of providing technical support. Only Matthew was able to talk about the overall cost of providing ICT within the school in terms that included technical support, and he was also able to isolate that cost and then speak about the spending itself. It is an important part of the findings that there is a need for schools to appreciate and be able to quantify, their costs in a way that includes technical support, together with the broader factors of time, and quality.

Conclusion

The responses, to the processes around data, indicate a range of approaches to the use of data are evident across the county. New Labour used centralised data to determine local priorities. In the majority of schools, the data supplied by central government is still at the heart of their school processes and setting their improvement agenda. In other schools in the study, they used the data more widely to tackle what they thought were the underlying issues and to deliver the type of education that they felt was required by their community. This approach is finding favour at a central level as they encourage greater local decision making, but it is governed by a strict accountability framework where those decisions need to be seen to work in terms of outcomes.

Regarding the success rate of projects, there is an absence of a clear purchasing process and a lack of internal research behind decisions taken within half of the schools in the study. The Coalition were encouraging local decisions, but previous practices in these schools, around purchasing and implementation had led to money being spent on projects that were less successful than anticipated. The answers showed a wide variety of thinking and practice around the claim of 'value for money'. In purely financial terms, Luke gave a response that indicated a very strong process that was geared around achieving 'bang for our buck'. In one of the schools, Matthew reflected a process that was clearly orientated around quantifiable outcomes from a teaching and learning perspective. The supporting of a teaching and learning with action research, and student voice, with an underpinning of pedagogy may have seemed laborious, but it appeared to produce results and clear thinking in a range of areas.

Technical support is a significant personnel factor in the success or failure of a system and it seems that more schools are prepared to challenge this, when it is of sub-standard quality. This

has led to improved satisfaction. However, only one respondent was able to explain a process around measuring the quality of technical support. The Coalition were encouraging local solutions, but this relied on those leading technology in schools having the capacity to establish clear processes and the evidence for this was inconclusive in this sample.

Chapter 8 – Curriculum changes

Introduction

In this chapter, I address the question around how changing political attitudes towards ICT are being reflected in the curriculum. It is a more specific question that will lead into a discussion in the next chapter around how wider political issues affect schools.

Under the Coalition government, the broad teaching of ICT was changed and schools were being encouraged to deliver more narrowly on Computing and Programming. This followed major business leaders like Bill Gates critiquing the quality of new people arriving for hire and Eric Schmidt (chair of Google) complaining about the quality of ICT teaching in the UK. Schmitt expressed the intention to relocate aspects of business outside the UK until it was it easier to recruit the 'right' people.

ICT or Computer Science

The overwhelming majority of responses to the earlier questions indicated that while the government had an element of control over what happened within schools, this was limited and the leadership that was exercised at a local level was a highly significant factor in the practices of a school. This finding might appear to run contrary to those around the decentralisation of influence, but this is not the case as at present. Those adopting this change were doing so

because they believed that it was an fair assessment on behalf of government about the needs of students. The change was being adopted by local decision makers who believed that the government was correct in thinking that industry required a greater understanding of computer science, and that the understanding of broader ICT skills were not as useful in the job market.

The New Labour government were eager to promote the 'effective use of interactive technologies' and the coalition wanted to encourage economic growth and utilise the potential of the software industries. There was a change, based on advice from the industry, in the disapplication of ICT from the national curriculum (Gothard, 2012). This change meant that the DFE moved the responsibility for curriculum planning and attainment targets away from central government and back to schools. At the same time, they indicated that they would like schools to create a curriculum comprising of programming and digital literacy, in addition to the ICT units of study.

It is necessary when presenting these findings to determine the extent to which the changes in central government have been reflected within schools' thinking. It is possible that the economic argument has been lost in some environments, as schools address pressing social issues in their communities. It is also possible that policy initiatives from central government might stimulate good practice being disseminated across schools, or that the more laissez-faire approach of the Coalition had a more positive effect on real development. Schools might have been frustrated at fulfilling centralised targets which they saw as having little relevance to their real needs and priorities, and that the new freedoms under the Coalition were allowing them to respond individually.

Philip felt that the Coalition government were taking a very hands-off approach. His belief in the importance of ICT to the school was driven by the place that he could see it had in teaching and learning and his belief in where it would take learning. In relation to the influence of government,

> 'I don't know that it has changed particularly – the way the country has changed in terms of direction has been going back to old fashioned ways. In terms of the bigger picture the government don't mind what you do – we are doing two different things. We have a lot of independence with the school environment now, in terms of what we want to do with ICT. It is up to us to choose to deliver a course and it is up to us about how we do that, so from that point of view I don't think their influence is that great. I don't feel pressure from government in terms of spending in any particular way.'

His school clearly saw its freedom under the new system and felt capable of identifying their priorities and addressing them. Matthew supported the view that schools were being left to determine their own priorities. He spoke about the ICT curriculum and the adaptations they had

made.

> ‘I think the government’s recent changes in relation to ICT were right. There was too much low level training going on that was largely irrelevant and was a waste of time. They are right to focus on the more creative elements of ICT and how to program – it depends on whether you want the children to be either a consumer or a creator of ICT. When we received the NextGen report we did pause and reflect and got the director of ICT and e-learning to make presentations to leadership, and we were very reassured that we… were tackling programming issues.’

An important point in his answer was that the government had not imposed any of these curriculum changes and that the school had only adopted the aspects that they agreed with following an internal process of consultation and reflection.

James had felt the effects of a perceived push from the government about the way that ICT would be taught in school. He saw a movement to purchase Raspberry Pi machines (although, these are a relatively small unit cost item). When asked about the role of government, his answer became fuller and he showed the role of the local decision maker in mediating and moderating the central decisions taken at a governmental level.

> ‘I don’t believe that there has been a direct drive for change. I think people’s interpretation of what the government are proposing has changed, and I think there is a kneejerk reaction. Gosh, the government are proposing this and we have to invest now in this way. I think Gove is probably sat there thinking I didn’t necessarily mean that! It has worked as it has made people think and the comments have made people question if they are doing it right.’

James saw the decision making at the local school and viewed the role of the central government as an influence on policy direction and encouraging change. In this model, James understood the importance of the local decision maker in deciding what was right in their own context.

John felt that the government had used ICT a bit like a ‘political football’. He saw that some of the Coalition government thinking on the ICT curriculum had merit, but was also clearly concerned about an overreaction in favour of computer science. He thought that ICT was a more appropriate mainstream subject choice.

'In some ways, I think that ICT, like a few other things, has been a bit of a political football… It should be about the ability to be a user. I could be out of line thinking that, but I still believe that it is what we should be teaching the pupils. They need to know how to use it. For those that want to program – fine we can teach that. I would ask the question for most of us - do we really want to know that? I drive a car but I don't need to know about it... I do need to know how to use it and I think this is true for the vast majority... I hate the idea that they all need to do that.'

His had been a specialist school and they had decided that it was appropriate for every child to study ICT. I asked whether the E-Bacc had made a major impact on curriculum choice. He replied,

'Well no, everyone does IT and I think that would be foolish for us not to do that. The English Baccalaureate has had no significant impact on us. Any of our pupils could do the mixture of subjects that make up the baccalaureate – many of them choose not to... I can say that we have had no significant impact on the numbers doing languages, history or geography. All of which are optional. I would think that was a retrograde step not doing IT.'

This shows the limited ability of central government to direct policy within school. John was interpreting policy in a way that was suitable for his environment and government influence was restricted to that enforced through an accountability mechanism.

Jean concurred that the main change of direction for ICT was in the curriculum and the E-Bacc. The use of the E-Bacc as a performance measure meant that it exerted the pressure of accountability through OFSTED. She said,

> ‘The biggest change has been the moves towards delivering computing. We have already looked at that change. There has been a further political dimension in the value given to certain courses, and the place they are given in the league tables. As a school this has meant that we have had to balance the demands of the government against what is right for students.’

Again, this response asserts the autonomy of the school in deciding what is in the best interests of their students, rather than slavishly following a curriculum innovation from central government.

In Chapter 9 we saw that the introduction of Computer Science courses into the curriculum (and the E-Bacc) has meant that schools needed to adapt. The absence of computer science specialists in the majority of schools meant that there is an ongoing need for collaboration, and this could utilise structures, such as, CAS (Computing at School) or TeachMeets.

The movement towards computer science has driven greater collaboration between schools and required ICT teachers to be more creative in their delivery. CAS are a body who are working across UK primary and secondary schools to ‘promote and support excellence in computer science education’ and are supported by both the DFE and the industry (including Microsoft). A lead researcher with CAS is Professor Simon Peyton-Jones who has a foot in both the commercial and academic camps, as he heads up Microsoft Research and is professor of computer science. In an interview he expressed the importance of practical teaching exercises and ideas rather than simply adding more technology in the classroom.

> ‘There is a wonderful web site and resource book authored mainly by a guy called Tim Bell in New Zealand called Computer Science Unplugged, I love it particularly because as its name implies it teaches computer science to primary school children without using computers at all. So, we are completely decoupled from the technology and that’s a very strong idea, we want to be uncoupled from the technology, so we are not trying to teach people about technology, we are trying to teach people about ideas.’ (Peyton-Jones, 2013)

The Computer Science Unplugged toolkit is a set of a visual, practical and intellectual exercises that deliver concepts and rely on a structure of what would be easily categorised as ‘old fashioned’ teaching and group work.

This leads me to the finding that many schools are planning to adapt the ICT curriculum to the teaching of computer science following central government encouragement. An outcome of this research has been that the school where I teach has linked with CAS, Manchester University, Barclays Bank, Microsoft and other providers to build a course entitled ‘Decrypting Computer Science’ that will equip ICT teachers to convert to computer science. The course gains a qualification from Manchester University and gives participants (at present we have nearly 40 teachers from across the North West) an understanding of programming. I think that this type of development is typical of the decentralised solutions that allow local decision makers to solve their problems at source.

Conclusion

The Labour government had placed ICT in the centre of its education strategy and Scrimshaw (2004) saw school leadership at the heart of enabling innovative ICT practice, alongside shared planning. The Coalition encouraged a real reduction in the number of QUANGOs that were working around ICT in schools. New Labour sought to prescribe the content of the curriculum, where the Coalition supported the curriculum moving in a more 'traditional' direction and introduced an accountability framework that allowed for more localised solutions and that judged the effectiveness on the basis of results.

Chapter 9 – The wider political and economic influences

Introduction

The study examines whether a contraction in public sector finance has altered the view of the role of ICT from the perspective of eight senior leaders. In the first section of Chapter One, I looked at how the thesis would be divided and in the second chapter I examined the ideologies and politics behind technology in school. Then in the third chapter, I saw how this debate was then reflected in an academic discussion between Edutopian and Dystopian schools. Now in this chapter I will look at the last of my sub-themes, namely, the effect of these wider political issues on those making decisions.

Before I examine how the schools in the study collaborate it is useful to recap some of the major national drivers for ICT. It could be argued that one of the key drivers behind ICT spending by New Labour arose from concern with social justice issues. The emphasis of the Coalition government was on innovation and academic rigour for its potential to deliver future economic growth. They also wanted to see decentralised decisions within schools. However, BECTA (2006), Scrimshaw (2004), Bosley and Moon (2003), Fullan and Hargreaves (1998), Sinclair & Mortimer (2007), BECTA (2007) all reflect on different benefits that local decision makers can derive from networks that allow them to share experiences and knowledge. This chapter shows that these schools are responding to the loss of local authority structures by establishing their own networks.

Under the New Labour government there was policy research that highlighted the importance of technical support and the difficulty schools had in recruiting personnel of a suitable calibre. It

would appear that an unintended consequence of the economic climate was that this situation improved and many schools were pleased with the quality of applicants for support posts. Under the county system all the schools used the UniServity system as a VLE. This has now changed in the post-primary environment. The use of the VLE and other means for sharing data with stakeholders remains central to the drive on school improvement. Data is integral in many internal improvement processes and is used systematically to quantify learning outcomes. Some of the schools now see an important role in building their own internal networks and involving parents and pupils in the use of data.

Government influences on spending

Hollingsworth et al., (2008) identified a set of key priorities for ICT in the school improvement process. The key ones were: a focus on teaching and learning, CPD for staff, and improved systems for record keeping. In each of their descriptions, the interviewees in the schools have described a process in which they are at the centre of the decision. This suggests that the decision making is localised and is being determined by local priorities, even though it may sub-consciously be influenced by the international dimension. The most common approach was for a single member of the leadership team to create the plan and then discuss this with the remainder of the team before it went to governors for approval. This model was followed by Matthew, Luke, John and James. A variation on this model which had similarities, but was more dependent on the available finances, and put a financial decision maker at the heart of the decision making process, was followed by Philip and Emily. Jean and Peter took their decisions in a more communal fashion with various plans that were adapted and reported back to the leadership team, rather than being strongly led by a single individual within the school.

Matthew's responses show that there are various levers for governmental pressure. Sometimes these are overt and take the form of ring-fenced funds, while at others they are less obvious but equally powerful, such as the use of the inspection framework. He and Philip felt that as localised decision makers they made the call about what was appropriate in their particular context. The school paid attention to the quality assurance mechanism of OFSTED, and felt that, provided they didn't do something as a result of the exercise of decision making that would cause an issue with the inspectorate, then they were largely left to their own devices.

Philip spoke about a Labour Frontis conference that had inspired him as to the potential of technology within the school context. He then spoke at length about the potential of ICT as a teaching tool and the possibilities it offered within the classroom context. The other influence that he referred to was the head teacher who found ICT challenging and saw it as a 'necessary tool rather than an exciting tool.' This comment resonates with several previous findings, it would be part of an explanation why ICT is one of the top cost centres and why schools are trying to support spending on ICT despite cuts in the budget. They could be doing this because they feel it is 'necessary' after being influenced by those of a more Edutopian perspective. Equally, 'necessity' rather than a clear vision could be an explanation for its inclusion in the leadership team responsibilities. When Philip was challenged about the role of government in the decision making process it drew the following response, 'In terms of the bigger picture the government don't mind what you do – we are doing two different things.' He then added,

> ‘We have a lot of independence with the school environment now, in terms of what we want to do with ICT. It is up to us to choose to deliver a course and it is up to us about how we do that, so from that point of view I don’t think their influence is that great.’

Philip responded as an assistant head teacher, and it might be argued that the influence of the government is applied to the head teacher and from him to the leadership team. However, this hypothesis was not supported by the response of Matthew, who was the head teacher in his school. Matthew was asked about the wider influences and he spoke about the need to spend money on ICT to recruit and retain the best staff. He developed this thinking and commented about the changes that had taken place with the addition of new buildings. He saw the pressure on schools in more traditional buildings to ensure that they remained competitive within the teaching job market. His response, based in a high performing school, could be taken to show that the most capable teachers are skilled in the use of ICT but are difficult to recruit because they are so few in number.

A factor that drove Matthew’s spending decisions was a clear vision for ICT and his belief that it was something that pupils found to be motivating and interesting. This chimed with the response of Philip. Matthew cited the next three major factors that followed: the need to be competitive, as parents, industry and pupils. When speaking about the context of schooling he said that pupils came from a ‘technology rich environment and we will not be doing them a service or motivating them if they are coming into a 20th century environment rather than a 21st century environment.’ Matthew had a broadly Edutopian vision for his school and his views about the role of technology

would be supported by his middle class urban catchment area. When asked the supplementary question about pressure from government his answer was concise, 'No, not really!' He was then drawn to elaborate on that answer and said, 'No, it is because they don't exert that type of pressure. The pressure is really from OFSTED and the criteria they use and obviously we are conscious of that.'

Matthew commented on how as a head he engaged with decision making, 'We start from the perspective of identifying our philosophy and what do we think our role is and then we work backwards from that point, to ask how we can achieve that aim.' He then asserted the independence of his decision making within ICT and the school, saying that the school determined what they wanted to do. 'If the government have chosen to get in line with that, then that is fine, but we don't do it for that. We would just make sure that we are not falling foul of any OFSTED criteria that would threaten our agenda – but we are not being driven by it.'

This is a pretty compelling answer from a head teacher who is asserting the independence of the localised decision making and who is confident that the decisions being taken are giving good value and are right for his community. It is helpful to have an answer from a head teacher that supports the view that has been present in other answers, namely, the Coalition government while adopting a laissez faire approach to intervention in schools, were intent on a rigorous framework of accountability.

Emily, like Matthew, felt that the major influence of the government was exercised through the inspection frame and the OFSTED process. Although, she didn't see OFSTED as directing the decision making, instead they were acting as a process of quality assurance. 'I already mentioned

OFSTED and they make you raise your game.' The other factors that she mentioned were the approaches being followed by other local schools, where the institution couldn't afford to be seen as not keeping up with them technologically. This factor was really applied through the overt pressures that were brought to bear on the school from the parents and the pupils. When the government tries, and the New Labour government was active in trying, to influence decisions then these attempts are often changed by schools to achieve the best results in their context.

Jean felt that the pressures in her school were from 'the parents, local government and the demands of local business.' Jean's comment on the pressure from local business had already been part of Peter's responses in his different urban context. When Jean was asked about the role of central government she was clear, 'I don't think that central government gives a lot of pressure.' She then went on to speak about another influence on the decisions, namely the expectations of the students. The idea of technology savvy students demanding a contemporary environment was the basis for much of the vision in Matthew's ideas. This would suggest that the majority of the school decision making was influenced much more strongly in an overt fashion by the local rather than the national context. Schools were conscious about helping children to access opportunities within their particular geographical context. The overt pressures that Peter felt from the government were purely financial.

> 'With pupil premium there are pressures on our budget all the time with the way that students are funded now. Schools like ours have always done relatively well from funding formula and that will have an effect. In fact it will have a massive effect.'

This response highlights an issue that could well be hidden by many of the other schools due to the relative affluence within the county compared to others in the North West of England. It would be interesting to conduct a further study on the correlation between pupil premiums and the changes in OFSTED grading of schools in the last five years. However, after highlighting the issue, Peter still asserted the autonomy of the local school in making the choices with the funding. 'The choice is almost entirely ours once the money has arrived.'

This leads me to the finding that the schools in the study felt that their spending on ICT was determined within the school and that they were free to choose how best to spend the money that had been devolved to them. Interviewees felt that the mechanism by which they were affected by the views of central government were by the accountability mechanisms of OFSTED. OFSTED is the mechanism by which central government can put direct pressure on a school, because they have a direct contact and examine the success of the policy making.

Communities of practice

BECTA (2006) showed that schools valued the opportunity to compare their costs with those of other schools and that gaining an understanding of cost information was extremely useful to allow leaders to manage proactively. Scrimshaw (2004) stressed the importance of working with the local community, other schools, and national networks in developing the quality of leadership and best practice within the school. Bosley and Moon (2003), Fullan and Hargreaves (1998) all point to the importance of leadership in technological innovation. However, not all the structures were working as effectively as might be supposed under the New Labour government; BECTA

(2007) noted that sharing pupil data, aligning networks and security infrastructures between secondary schools and the LA were 'embryonic at best.'

BECTA (2007) noted the rise of other ways of sharing information, with 59% of secondary teachers locating digital teaching resources online, and 73% claiming to have uploaded their own work for others to use (46% claiming to do this on a monthly basis). Sinclair & Mortimer (2007) stressed the role of local authorities in facilitating best practice with, at that time, 94% employing an ICT curriculum adviser and 78% employing more than one full time equivalent. After the election of the Coalition, many county support teams wound down the level of services provided by the authority to schools and academies. The county education team no longer employed either the primary or secondary advisors that they used to employ under the New Labour government. Many of the former structures ceased to exist and it was important to explore what sharing and planning processes existed for these interviewees in the more decentralised world of academies.

It should be noted at the outset that there are two main school collaborations within the county and not every school is part of one of these networks. In the south of the county there is one large group and in the north there is a smaller three school partnership. There were some interviewees in this survey belonging to these groups and others who belonged to neither of them. I have needed to edit some of the responses slightly in order to make all aspect of this summary anonymous.

When I asked Philip the question, he referred to one of these groupings of which his school was an active member. It was,

> ‘limited at this stage – we would like to be doing more. We do some stuff through the consortiums. There is some sharing of approaches and I know my network manager doesn’t attend those as much as I would want him to... He does more sharing virtually than face to face… In other words we are not sharing as much as we would like to do and I think there is an opportunity for us to do a lot more.’

Philip saw the benefits of collaboration and valued its role in developing his leadership and innovation within his subject area. The sharing of ideas was probably fairly described as being more than ‘embryonic’ and so it could be argued had moved forward from the BECTA (2007) survey of links with the local authority. The collaboration with other schools was determined by his consortium links and personal links with other schools, where he could telephone a colleague in that school and gather ideas on a particular difficulty – as evidenced by the whole school approach to behaviour for learning and the work with the FROG VLE. At the same time his network manager was not engaging fully with the local collaboration, as he had not always engaged with the county system, and he seemed to prefer the links that existed on the internet. The links on the internet for the network manager involved various websites that offered support, but notably *Edugeek*.

Matthew wasn’t part of any of the existing county networks of secondary schools, but did talk about their active participation in a range of alternative networks. A growing feature in the county has been for a newly formed academy to federate with a range of local primary schools to offer support and services that go beyond those once offered by the local authority. Matthew was developing a federation in his school. The federations are sometimes ‘soft’, where the links are

quite loose and tied to services and support meetings, while at other times they are 'hard', with a legal structure and a set of people employed by the federation itself.

> 'The Learning Community is our partnership with seven feeder primaries and is at the hard edge of a soft federation and has its own board of governors and its own development plan. It has its own streams of delivery within the development plan and ICT is a big part of that. We put staffing into the primaries and it has its own resources. We put time and money. It will probably become an academy trust and at the moment we are talking to two primaries and that then will probably just become three sites – two there and one here. The other partnerships are through the teaching schools alliance... We sit and work together to make sense of the agenda and there are some collaborative partnerships. So the teaching schools network is a big partner.'

Matthew could see the role of ICT in developing networks, rather than just benefitting from networks. Equally, ICT services are an aspect of federations in many of the links between primaries and their local secondary academies.

Emily was in a similar position to Matthew, in that she was not involved in any existing county relationships with other schools. The only support that she cited in her answer was a user meeting that is hosted by the local education authority and is funded by the schools and academies who purchase their MIS through the council. In this example of collaboration, she was clear that these relationships were useful and brought benefits to the school from shared expertise.

In a similar way, Peter liked the idea of collaboration and had been involved with structures that were supported by the local authority. He felt that he was now operating in an environment where these structures had gone.

> 'We are not involved in any collaboration with any other schools on ICT, although we used to be. We are involved in a lot of collaborations with teaching schools etc., but the answer is no, as those days seem to have died. We used to have a town consortium for ICT and this was supported by the county ICT advisor. Government cuts have meant that he is no longer there to drive it forwards and he would have courses, and you would meet with people from other schools, and then you would agree to come over and look at things. All that has gone now because you never meet, which is a shame!'

In Luke's interview when we reached the question about collaboration then the interview was well advanced and he felt that we had already addressed aspects of his collaboration as part of one of the county school groups. Throughout his replies Luke showed a very open attitude to building collaboration opportunities with other schools. There are elements in these responses that show he thought that there was a benefit in collaboration both in saving time and money by sharing expertise. In the opening question he spoke of the role the school was adopting in a range of new training networks,

> '… [*the head*] has now taken a fellowship with the National College comprised of 12 head-teachers who will spend time together working with the Business School and the idea is that around March they will return to the DFE with a recommendation. Two of the last recommendations have been around teaching schools and the point I am making is that it is a group doing serious work and has the ear of the Secretary of State and is, therefore, turning into policy.'

This had led the school to take a leading role within one of the existing county academy/school networks and they were taking a remit with 50 other schools across the North West. The school had linked up with the National College and were developing the teacher programmes, recruitment and training of Specialist Leaders of Education (SLEs). They had also worked alongside a university to create schools direct that linked with the future leaders programme. This type of programme would see trainees employed within a school and they felt that the academic rigour applied to the applicants would ensure a program that created outstanding NQTs. It would involve university training for a few weeks and then a day release situation. The relationships built in this process were being used to benefit ICT within school. Luke said,

> 'We have put interactive whiteboards into each of [the classrooms in a particular school department] (and that call was a two way call) after we had sent them out to a range of other schools to look at their practice.'

Similarly, these relationships were affecting the more hard edged purchasing decisions rather than being confined to the teaching and learning topics. Luke said,

> ‘At the moment we are replacing our machines at a cost of about £275 per machine... We cut some pretty keen deals and we do involve other schools in the [*county secondary*] group in doing that, so we are starting and not doing it as effectively as we could in the future, but we are looking at procurement over a range of schools, and how you guarantee value for money, and keep that as high as possible.’

The network of relationships that had been formed acted as a way of giving Luke the control to think about making collective purchasing decisions and to further loosen his links with the local authority. This type of collaboration is less open to central government control and more likely to support and develop the work of schools in their local areas. In a similar way to the Decrypting Computer Science course which I mention more fully at the end of this finding, the work of Luke was responsive to local needs and it enabled them to share ideas, costs and allowed them to influence practice.

John was in the same county group as Luke, but his experience of work with the group was quite different. When asked the question, he responded,

> ‘I suppose the answer is that we don’t have much collaboration in terms of ICT... we did a lot of work with a range of schools, as part of [*a county group*] the network managers meet on a regular basis to share ideas and expertise. In terms of the curriculum level there is no vehicle that is there, as there was in the past.’

Unlike Luke, who had used the county group to challenge curriculum practice and drive change within his school, John had found this structure ineffective. Philip had benefitted from the

opportunities to share curriculum practices with the county group and yet didn't feel his network manager had benefitted. This suggests that the group relationships are building within the county and, while the formal processes are still not embedded, they are providing limited support where it is being sought.

Jean was in a similar position, in that she felt that she could gain more from the relationships between the schools than they were at present delivering to her. She said,

> 'We have collaborated with other schools outside the local education authority, for example, Thomas Telford. We also work with a partnership of local schools within our authority and this partnership has tried to source things together collectively, although it has been difficult to gain success in the area of collaborative purchasing.'

James also saw changes to the local education authority support mechanisms that had been replaced by collaboration with other local schools. There was evidence of the sharing of expertise and developing ideas around budgeting. However, his answer was full of frustration about the additional benefits that could be achieved by further collaboration. This frustration seemed to have the potential either to develop into stronger relationships or break down as something that was taking time and was futile and unlikely to affect his practice. He said,

> ‘I am desperate to have collaboration with any other school…. We have looked at joint purchasing and it didn’t work out and that is fine. Interestingly enough, [*another school*] didn’t want to talk to us and a lot of successful collaboration is based on personalities. A lot of schools also want to act like insular little communities... I think this is something down to competition. In private industry you don’t talk to your biggest competitor about how you work and what you spend – but you have got to get over that and share best practice.’

James’ frustration extended to the work he had done even within his local community,

> ‘I approached our primary schools - and saw that we had a set of skills in supporting ICT - with two offers, either to support them or secondly, to pay for all their Microsoft licenses (given the changes in the Microsoft spend for ourselves). One primary school came back and said they were interested in both. And they had in their technicians, who said, we buy in our own OEM licenses and we don’t want your support. We can’t even give away support! No-one wanted them and this made me a little despondent.’

The NESTA report (2012:8) picked up the fact that hundreds of millions of pounds are spent on digital technology in UK schools every year. Innovations jump from interactive whiteboards to one-to-one tablets, as new ideas constantly arrive at the marketplace. However, there remains a set of key questions around how these technologies improve learning and standards; equally, how can schools and decision makers ensure that they utilise the potential bound up within their investments. In relation to merely VLE technology. SecEd cites the head of school programmes at e-skills UK saying,

> ‘we are a very fragmented profession with a very fragmented role and the ability to create a coherent voice and a coherent debate about pedagogy is getting harder.’ (SecEd, 2012:DT2)

Nearly all the schools within the study are engaged in developing wireless systems and these are growing in complexity. The market has the traditional wireless routing devices but also a range of more robust blanket technologies. Clearly this type of network migration will be essential in moving to a one to one model. An important factual finding in this study, that will help other school leaders, is the need to examine environmental ‘learning space’ factors more fully in the design process, and to test these with smaller scale pilot projects. The study contains examples of schools piloting technologies with a wider application across the county and it would be of great benefit to all if experiences were shared between technical support staff. I think James’ response also points to the potential problem in the way the new structures are developing. There is a dichotomy between working with local schools to share expertise and ideas (which fits easily into the mind set of educationalists who simply want to do their best for the children in their charge) and the competition ethos that now exists between local schools. On the one hand they want to know and support their neighbour but on the other there is a commercial need to be better than them and attract children to their own establishment.

This leads me to the finding that after the loss of the local authority networks, many schools are creating new networks and joining existing networks that are both local and national for sharing expertise, experiences, resources and ideas. Collaboration allows for more robust consideration of TCO and acts as a driver to reduce costs and exemplify best practice.

Dyke and Harding (2007) discuss the potential for the use of cameras in classrooms to support teaching practice and the possibilities they offer to bring 'people together to learn directly from first hand experience and develop more diverse communities of practice.' However, they are also concerned that expensive digital technology when it is used in relatively resource poor teaching environment could reinforce a digital divide. Similarly, there are a variety of practices growing up in relation to the introduction of tablet based technologies and the management of these devices within the school environment. Peter reflected on an unsuccessful spend that had resulted from issues with the learning space itself.

> 'I think the nature of the building, and the structure has a lot of steel within it, and that has had a massive impact on our wireless performance. I would have made less reliance on wireless technology… we are very heavily reliant on wireless. With 450 wireless machines logging on at once that is going to put a huge pull on any structure, and now I would be more attuned to some of the issues there.'

Peter was frustrated by a process that had failed to spot the environmental issues at the implementation stage. It could be argued that a way of avoiding this would have been to pilot the new system prior to a full implementation. However, Peter's issues with wireless were reflected in other responses, such as Philip's, and are common in schools moving to a mobile technology approach.

Changes have occurred over the last couple of years in the ability of schools and colleges to use biometric data for automatically recognising children. A few schools use biometric data to identify

visitors and more use it in the place of payment systems within the canteen, or even as a means of gathering printing from school devices. When the legal framework for the use of a piece of technology sees a change then there is anecdotal evidence of unstructured collaboration throughout the county. There is also a wide range of practice that is evident from the school websites across the county, in their approach towards the open publication of policies around data protection, and freedom of information. This would indicate that there are variations of practice in this area.

Finally the introduction of computer science courses into the curriculum (and the E-Bacc) has meant that schools need to adapt an infrastructure to allow for coding and the use of smaller devices, such as, the Raspberry Pi or Lego NXTs. The absence of computer science specialists in the majority of schools means that there is an ongoing need for collaboration, and this could utilise structures, such as, CAS (Computing at School) or TeachMeets, or could evolve as schools develop their own networks of expertise. Selwyn noticed a similar rise in new ways of networking and collaborating.

> Parallel to these interests, it is also likely that many aspects of educational technology will increasingly revert to “grass-roots” arrangements, where networks of enthusiastic individual teachers play an integral role in sustaining and developing the shape of the educational technology community. One key group in this respect has already been loose alliances of “open source” and “open education” enthusiasts. While it may be naïve to imagine a totally decentralised network of technology-using educators “doing it for themselves”, schools technology is already beginning to be run along more self-organised and self-sustaining lines. (2011:403)

Virtual Learning Environments

VLEs are one of the more contentious part of the neo-liberal education policy landscape. Inherent in the idea of a VLE is the erosion of the learning space. Essentially, learning platforms are sold as a means by which teachers, students and often parents can communicate and share resources. They are designed to integrate with the school management systems and to be open for access outside of the school building. The Edutopians can view them as a force for liberation and empowerment of learners, yet they are often a means of allowing parents to ‘check’ that children are doing their homework. They embody ideas around individualised learning and personalisation that run counter to traditional teaching and working in more social groups.

The most challenging aspect of the VLE concept is that they will allow for the breakdown of the traditional classroom, with learning being done alone in virtual or cyber space. SecEd (2012:DT2) support a view that learning platforms, virtual learning environments (VLEs) and managed

learning environments (MLEs) are now ubiquitous across the British secondary education market. Scrimshaw (2004) discussed the importance of an internal network or VLE as a means of enabling teachers to share information and resources with one another and with students. SecEd (2012) adds,

> 'As well as being used for learning content, assessment, communication and administration, many VLEs feature wikis, blogs and 3d learning spaces.'
> (2012:DT2)

They go on to refer to them as a 'bag of tools' for teachers. However, the same SecEd article highlights teachers' issues with VLEs, that are often incompatible from one school to the next, and the issue of interoperability between platforms, especially those between primary and secondary school level. It also picks up a concern amongst some teachers about the problems caused if the school broadband link went down and they were left in class without access to data or resources.

A common VLE for higher education institutions is an American system called Blackboard. Moodle is a widely used system, in both schools and further or higher education institutions, and is an open source solution. The problem for many schools in adopting the Moodle solution is that they generally need to employ an additional technician who is able to set it up and manage it initially. This has a cost in wages that can be overlooked.

In the early 2000s, the county where this study is based conducted an analysis of the various learning platforms and decided that the most useful was UniServity. This meant that UniServity quickly became the platform of choice for both secondary and primary schools across the county.

After making the decision to promote UniServity, the council team found they were receiving feedback reporting frustration in the secondary schools and sometimes criticising the perceived lack of innovation by the UniServity team. The county team continued to encourage schools to stay with UniServity and to wait for their updated 'Life' solution. This continued right up to the breakup of the county support. Various schools in the study had broken away from the UniServity platform at different times. This reflects the view of Buckingham that there is often a significant gap between the reality of the learning platform and the rhetoric that often accompanies it (2007:130). This is an observation with which, from personal experience, I would fully concur. Conole and Dyke (2004) point to the slow uptake of VLE technologies with peak use directly related to teacher intervention and cite other research to show them often being used as 'shells' for webpages and dissemination of information.

Two platforms are growing in popularity within the county. The first is Moodle, and the second is the FROG solution which was designed in Halifax. FROG integrates well with active directories and allows for external access to files away from the building. It also provides various extras that enable it to be used for parental access, reports, attendance and the setting of homework.

Philip's school had moved to FROG and had set a list of things that every department needed to include on their pages. The school saw a different audience for the VLE and the website. They were using FROG both for setting homework and assessment, although they hadn't given parental access to the VLE to enable them to view the homework set for their children. It is possible to link a host of pupil specific information into the parental interface on FROG using the extra abilities that are provided through SIMS and active directories. Philip's school was using a different

product, called INSIGHT, that provided access to these type of figures and this had mitigated against integrating them into the FROG solution.

Matthew's school were on UniServity but had experimented with alternative free solutions, such as Moodle. The school saw the VLE and the website as two separate entities. The website acted as 'a key marketing and communication tool to represent the qualities, standards and ethos of the school.' The VLE, on the other hand, was used as a mechanism for supporting teaching and sharing practice. The school employed a dedicated web manager, but aspects of this role were to support other websites associated with the institution. Matthew accepted that the material online differed from one department to another and that this was based on the technical confidence of the learning area. If one of the departments had digital enthusiasts on the team they often moved further and faster in building the online aspects of the curriculum. An innovative area of the thinking within the school was the potential of QR codes and augmented reality for both marketing and signposting. They recognised that these technologies held the ability to deliver a digitally rich experience to children as they walked around the building.

Luke's school had also moved to FROG as the platform for providing their VLE, and this was cited as their most successful ICT spend. They commented that the 'VLE is massively better than what we had before, and is orders of magnitude better than before.' At the same time there was also a disparity of practice between different learning centres. He added 'there is a little bit of inertia to overcome with both staff and students in relation to the VLE. We are giving them no choice and pushing more and more across the VLE.' While this may seem a little heavy handed and negative,

it also exhibits a degree of leadership that recognises the potential for a new system and invests effort in ensuring it embeds itself.

John commented that they had moved to the FROG system and had bought into the additional parental portal package offered by the company. John's school were using FROG to allow parents to see data on both behaviour and attendance. The school were encouraging parental access to the system by recording the register for each lesson as a number from 1 to 5 based on the student's effort. This would allow regular feedback to parents about students' level of performance within their studies and would automatically trigger aspects of the behaviour management policy depending on whether they scored a 5 or a 1. The school had focused on the delivery of independent homework tasks that were bigger and broader in scope than a single subject and the VLE was the mechanism used for those pieces of work. The FROG package has an internal email system that was used for homework communication between the pupils, the parents and the school. The consistency of the VLE differed within the school, 'Some staff are very good at this [*using email for homework*], and others are less so, but that is always going to be the case.'

Jean's school were at an early stage of development in relation to the VLE. They had only just separated the website and the VLE apart from one another. She commented that 'the development of the VLE is a whole school priority in the next academic year.' The responsibility for e-learning was in the job description of a member of staff. The school was examining its platform. They had been using UniServity and were now 'looking at what are we pitching to the community and how do we take it forward.'

Emily was a little unsure about how the VLE was used, but had picked up a sense that there had 'been difficulties in consistent stuff from departments.' She added, 'it is about quality and some departments are much better than others.'

Peter's school had stayed with UniServity and were in the process of trying to move to UniServity Live. He reflected on the issues for a school in the management of a VLE, 'we have one woman who is doing this type of work and we could do with an army.' The vision was to create 'a virtual school… we want to be able to access teaching materials from home.' There was the feeling that to achieve the vision, 'if we had two or three people we could probably achieve what we want to do' and that there were schools with a base of five people whose job was to populate teaching materials on behalf of the staff. Peter thought that he had developed the VLE but that 'it is restrained by staff time and cost and we have taken the decision, rightly or wrongly, that it goes through one woman to give a corporate image and get out the mistakes.' Peter acknowledged that his approach was not being followed by other local schools, where each member of staff was able to populate the VLE and this had followed a significant investment in staff time. The observation about other local schools taking a different style was fair, in that it reflected the approach of Philip, Luke, Matthew and others in this study. Peter felt that an issue with the approach in his school was, 'that staff don't like it, as it is a time issue.'

James was in the second school in my study that had opted to use Moodle and thought that this was popular with students as it allowed them to access work outside the classroom. In a similar fashion to Peter, James acknowledged that time was an issue and had caused reluctance on the

part of staff to move material online. ‘Teaching staff react very poorly to anything that they perceive as giving them an increased workload. It did cause an issue and the rollout stalled.’ He had adopted the freer approach to publication of material on the VLE and this had found an audience amongst ‘younger and newer teachers’ because they ‘came in and they wanted to use more PowerPoint and videos and this is where the VLE has helped.’ Each area was permitted to develop in the most appropriate fashion, ‘we have purposely allowed them to do what is appropriate for their area and we will work with them.’ He had offered a range of staff training, from formal to informal, and was relying on competition between the departments to drive the development of the platform. However, he had now concluded that ‘you can sell a VLE but staff will only use it when they are ready.’

This leads me to the finding that the county standard for a VLE moved after the election of the Coalition and the two new VLE providers are FROG and Moodle. The favoured new platform is FROG. It is clear within the study that the idea of the use of a single platform for a VLE within Cheshire has completely broken down. Of the schools in the study 40 per cent had stayed with UniServity but some of these were experimenting with a move towards other solutions. Of the rest, 40 per cent had moved to FROG and were very happy with that product, while other schools had gone for Moodle. The era when UniServity was the default platform has gone, with just a couple of schools in this study still being on the original platform. Only one school had expanded it to the improved UniServity Live version.

All the schools were clear that a VLE was still a part of their ongoing planning for teaching and learning, although none seem to have a clear pedagogical rationale for this. It is probable that

with the rise of personal devices we will also see an increase in the number of personal learning environments (PLEs). This type of technology will allow the student with such a device to build their own cloud based learning space that includes a range of materials to suit their needs and learning style. The movement towards a PLE type technology solution will fit with a pedagogy that is based on facilitation rather than control or centralised instruction.

The linking of personal learning devices and the software environments will increase the pressure for improvements in the ability to analyse students' performance. If students are working online and in a cloud based environment, then there must be an increased ability to use software that is capable of spotting their needs and misunderstandings

Conclusion

The main instruments, that are currently being employed by the central government to influence what is happening, are the inspectorate, and the changes to the funding formula which force schools to think about their spending differently. The accountability process is at present focused on outcomes and not on the processes or the decisions that have been taken.

The width of response and the differences in approach shown by the schools in the study would indicate a significant degree of autonomy in the decision making processes around ICT. Each of the schools within the study are spending widely differing sums in the different parts of their provision. Some are seeking to promote innovation and pilot new projects, while others are seeking to rationalise the existing infrastructure and cut back on the overheads associated with the area. Each of the schools had a clear view of the ongoing importance of ICT. As Selwyn (2011)

says,

> It is highly unlikely that UK schools will suddenly cease to be resourced with high-tech "kit". Indeed, under the more permissive conditions of a post-BECTA landscape, some schools' digital technology resourcing will undoubtedly flourish and diversify beyond the levels reached through the New Labour initiatives. Yet, as in any case of increased marketization and reduced standardisation, many other schools' technology resourcing will undoubtedly regress – with school leaders and managers deciding to spend less money on technology.' (2011:404)

The Hay Group (2012) in a report looking at megatrends, or the long term processes that will affect organisations and leaders over the forthcoming decades, identify six of these megatrends. One of these is the need to embrace digital natives and that organisations must accept the ubiquity of digital knowledge and embrace the creativity, curiosity and open mindedness that ICT brings. Another is the need to harness technology to innovate with a global context where miniaturisation and virtualisation are converging nano-, bio-, and information technologies. This report serves to show more of the ongoing debate around where these ICT trends sit alongside globalisation, climate change, pluralism and demographic shifts. This type of policy analysis, with its apparent international consensus, can easily be embedded into local policy and agendas by head teachers. The authors of the report think the megatrends will affect thinking for years to come,

> 'They affect all regions and stakeholders, including governments, businesses and individuals. And they transform economies, societies and policies at a fundamental level.' (HayGroup, 2012:2)

The language of the report, when it talks about 'digital knowledge fast becoming the powerhouse of the global economy' Hay Group (2012:9) and the need for actionable knowledge of complex technologies, has a potentially profound subconscious impact on the thinking within schools. It says that in many organisations, leaders may not be the experts themselves but they must know enough to hold the ring between the competing views within the institutions. The language within the Hay Report reflects an Edutopian rhetoric of macro priorities which can easily influence the thinking of leaders on a sub-conscious level as it reflects the thought processes of national governments, parents, teachers and local business.

In Question 5 of my interview schedule (Appendix 1), I sought to ascertain whether there was any perception with my interviewees that change in school was driven centrally by government policies. The interviewees took the view that the majority of decisions were localised within schools who tried to do what they perceived was right for their own context. They thought that schools had a process that was heavily localised where they were responsible for driving change and that the real decisions were taken at a level within the organisation. This would suggest that the local decision maker felt more adept at making the right decisions for their context than would be achieved if the government sought to centralise some of that process. Luke summed it up with, 'I don't feel any massive pressure from the government. The money comes into school and we determine how we use it.'

The schools in this study that showed a clear vision and strong leadership of ICT could make statements that lead to the conclusion that their decision making existed broadly independent of central government. The New Labour government applied its policy influence in a targeted fashion as it channelled funding streams and supported various initiatives. All those studied felt

no overt pressure from the Coalition government to spend money on ICT in any particular way and many felt that this was right, as they were better able to determine the best approach in their own particular context. The external influences that interviewees identified came from the needs of the local community, such as, local business, 'techy savvy' students and parents.

Chapter 10 - Conclusions and recommendations

Introduction

This study began while the New Labour government were still in office. The role of ICT has been described by one commentator as 'one of the most highly-funded and publicised areas of educational policy-making under the previous New Labour government' and as a quintessentially New Labour area of policy making (Selwyn, 2011:396).

I set out to explore whether a contraction in finances has altered the view of the role of ICT within education for my group of schools and academies which I broke down into a set of three key questions. The findings to these are in the next sub-section. Yet, over the course of the last five years there have been many changes both politically and technologically and it is hard to assess fairly, at this proximity, the significance of those events. Selwyn (2011) refers to the changes as the systematic dismantling of a 13 year programme to support ICT in schools. He expresses the view that the New Labour governments '(over) privileged and (over)emphasised the educational importance of technology' and after doubting that this would change in any incoming government in 2015, he remarks 'In other words it could well be that educational technology has had its heyday as a frontline area of state policy-making.' (Selwyn, 2011:407)

Instinctively, change seems to present a face that threatens, but like Janus it has another face full of opportunity. It was easy to distrust the actions of a Coalition government that appeared to want to reintroduce a 'traditional' form of education. As we saw in Chapter 2, the global financial crisis has meant that we are living in an age of 'reducing finances' where the public purse is

tightening and there is a real need for state spending to be prudent (and to be seen to be prudent). At the outset of the interview process, with banks like Lehman Brothers collapsing, it was clear that a study into the thinking behind spending public money had the potential to be a sensitive area. This was transformed into a double edged sword when the Coalition government pursued a policy running directly counter to that of their predecessors and decentralised control in schools. If decision making wasn't robust and money was seen to be being wasted that would be serious, but if school based decision making lacked the wider perspective then that would also be potentially difficult. Selwyn notes going forwards that,

> Under the Coalition's tenure, technology use looks set to be aligned with a much narrower set of concerns – not least a return to "grammar school" arrangements for curriculum, pedagogy and assessment. As such, the nature of technology practice in schools could well become more institutionally rather than individually focussed – with a growing use of technology for supporting business-like models of institutional efficiency and reductions in cost. (2011:404)

In reality, I was surprised to find that many of those interviewed were broadly supportive of the general direction of Coalition policy. However, for my interviewees, Selwyn was correct in that the central government cost cutting had brought a tighter focus on what was being bought, and had reduced spending on peripheral areas which were felt not to be directly impacting on the classroom.

The Road Travelled – Conclusions

To explore this aim, I have focused on three key questions: firstly, who makes the ICT spending decisions; secondly, what processes and priorities are used within that decision making; and thirdly, what wider political issues affect those decisions.

In relation to the first key question around who makes the decisions, I have found that formal academic training in ICT and the issues around controlling its implementation and expenditure were very rare on a leadership team; instead many were self-taught. Over a decade ago Conole and Dyke (2004) could see an increase in the use of technology to support teaching and learning but a lack of clarity by practitioners on how to use it. At that point, they add that practitioners often relied on common sense rather than pedagogical theory (2004:115). I find that the models of leadership deployed around ICT often still made the expenditure very dependent on the single individual and as a result procurement decisions could often fail to take into account the total cost of ownership.

In relation to the second key question around processes and priorities. It is a finding of this study that ICT is still a major part of spending in schools and was always ranked in the top five areas. In every school the most significant outlay was staffing which usually accounted for over 80%. Many schools were spending about £100k per annum on ICT hardware and software and then additional sums on technical support and training. The control for this expenditure was the responsibility of a member of the senior management team. The choice to spend money on ICT was supported by a belief that ICT enriched the curriculum and could lead to improvements in examination results. Some schools within the study could show a robust process that was clearly communicated across

the organisation where the purchasing was often based on small scale pilot studies that formally reported on their success. Other schools may have lacked the formal structure of a process but were buying solutions that fitted with a clear vision and demonstrated long term planning. There were several examples of schools in this category that were spending in order to rationalise their model in the medium term. The interviewees that were more satisfied with the outcomes of their spending tended to have a more rigorous process and an evaluation mechanism in place. Interviewees benefitted from greater clarity and transparency around the process and this meant that they would consider wider factors in the TCO, such as training and replacement. Some interviewees believed that there was a demand for ICT resources from many strong teachers and that they needed to invest to attract the right calibre of personnel.

UniServity is no longer the default VLE platform for the county and it has been largely replaced by either FROG or Moodle although there was often an absence of a clear vision for the role of a VLE. Irrespective of the processes that were followed the interviewees seemed pleased with the general quality of the technical support they employed. A perceived advantage of strong support was its impact on teachers' confidence to use equipment. However, the cost of this support was often not linked in their responses as part of the overall budget and, therefore, the interviewees didn't talk about the cost of maintaining failing equipment in financial terms. All the interviewees remained firmly committed to the systematic use of ICT for gathering data about student performance and many were examining ways of freeing access to this to improve further.

A few saw a move in the medium term towards 1:1 computing and the ubiquitous use of tablet technologies across the curriculum. This change would alter the way that schools budget for ICT,

and would move their key costs into supporting open access to Wi-Fi, networks and software rather than providing desktop equipment.

I have endeavoured to correlate any changes with the spending of the school and the socio-economic background of its students. An area for further investigation could be into whether there is a real difference based on the economic affluence of the catchment area and the funding approach designed around the use of personal computing devices. It would need to be investigated to see if schools saw an advantage in mobile technologies, as they provide a method by which schools could pass some of the ongoing costs of ICT to parents. Underwood et al. (2009) report on the ways technology supports 'narrowing the gap' and it would need further investigation to see if mobile technology adoption is acting against this agenda, in that only some affluent catchment areas could allow for the passing on of some ICT costs to parents.

In relation to the third key question around the wider political issues, there was a widespread acceptance of the broad Edutopian globalisation narrative and so ICT was a part of the skill set that these leaders saw as being necessary for citizenship and economic success. Yet, the study shows that most of those making the decisions did not feel that they were under any pressure from the government to spend in a particular way. They thought that there had been a significant relaxation of ring fenced funding and centralised control with the Coalition. The 'reducing finances' measures from the Coalition government had not had a dramatic effect on ICT spending within the county, although schools in a more urban environment were more likely to be looking for ways to retrench and cut costs as they had been disproportionally affected by the reduced budgets. Schools in rural areas tended to be keeping up or increasing their level of spending, but some of this was designed to cut the long term maintenance of systems.

Little, if any, reservation was expressed at the moves to devolve spending to the local level as leaders felt that they were well placed to make the best decisions for their schools. The reduction in money had brought all spending under review and most schools thought that this had improved what was being bought. At least one head teacher believed that the standards of oversight had dropped under the centralised approach of New Labour with its ring fenced funds. Many interviewees felt that they had cut contracts for software that wasn't being used and an effect of the spending cuts had been to improve the sustainability of the structures they had in place.

It was a common view that the way the Coalition were measuring the effectiveness of local decisions was through OFSTED and the accountability framework of results. Schools thought that provided their decisions 'worked' in the sense that they improved results then they were left to make the choices they believed were the most beneficial to their local communities. At the same time, schools felt under pressure from pupils, parents, employers and the community to 'keep up' with technology.

The move towards teaching Computer Science rather than ICT was broadly welcomed. Many schools had adopted this idea because they believed that it would be beneficial to their students and that they would appreciate the academic challenge of learning to code. The sentiments from Simon Peynton-Jones about 'Computer Science Unplugged' reflected the way that some of those interviewed saw it being delivered. However, others expressed reservation that the rhetoric around this move would push too many students towards programming who were more suited to a broader and more general ICT framework. This change, along with many other ideas from the government, had brought schools together and created a range of unfunded, and process driven,

methods of collaboration. The reducing of finances and the academies programme have broadly removed all forms of local government support for schools. However, many schools were developing their own systems that were more cost efficient, and allowed them to share good practice at various levels. This type of collaboration is likely to grow and would appear to be a very positive development as it improves the quality of delivery. Networks were being created that were local (partnerships with primary schools to share expertise), regional (partnerships across schools in the north and south of the county) and national (teaching schools networks and internet forums, such as Edugeek).

Key Recommendations for Practice

Identifying the key recommendations for practice has to reflect the change of priorities that has occurred over the process of researching and writing the thesis. It has seen the change from a New Labour government who guided millions of centralised funds into ICT, to a Coalition and then a Conservative government that has turned in an altogether more sceptical direction regarding ICT.

The first recommendation is for school leaders to focus on what type of classroom culture they are trying to build and to create a shared vision for the way that technology impacts on learning. This discussion should take into consideration the views of the Dystopian school and not be unquestioning towards the rhetoric about globalisation and necessary change. The spending decisions on ICT then need to balance the total cost of ownership (TCO) against the measureable or desired outcomes from the technology. Clarity of thought on the whole school focus and the qualitative and quantitative outcomes for students should ensure a tighter and more refined set of procurements that are supported by appropriate training and implementation choices.

The second recommendation is that if schools continue to face reducing budgets they should re-examine their existing ICT overhead and plan a costed renewal cycle based on setting expectations around what can be sustained rather than short-term commercial pressures. The renewal programme should evaluate possible cost savings around virtualisation, outsourcing of technical teams, use of print management techniques, re-examining the contracts for educational software, outsourcing of data storage and software, use of personal devices and reducing the pupil to machine ratio. Any renewal programme needs to consider learning spaces, mobile technologies and the potential for social inequalities.

The third recommendation, based on the move towards localised spending decisions, is to ensure a member of the leadership team has oversight of ICT and a background of formal training that allows them to understand and plan for the range of issues around TCO. It is a role that needs to understand the centrality of data and its place in supporting school improvement. The leadership of this area also needs to prioritise strong technical support being made available to staff as a key factor in system success. The leadership role should be supported by a strategic group drawn from across the school as a way to ensure that spending remains grounded in the reality of the classroom and not a selling technique or inflated rhetoric from the Edutopians.

The fourth recommendation is for schools to continue to adapt central government initiatives and challenge reactive central planning. The move towards teaching only Computer Science and discontinuing ICT at GCSE appears to be a government over-reaction to fair criticism from the industry around the absence of programming skills and recruitment shortages. It would seem that some of the respondents are cautious about the speed of a move towards the production of digital content and away from its consumption. We should encourage networks and opportunities

for listening and collaboration between schools, exam boards, industry and the government as these would help to create more grounded decentralised solutions. They establish communities of practice which better reflect the needs of the local economy, the desire for a more traditional approach to teaching and are more adapted to the skills of all students.

The Road Ahead - Reflections

The study was carried out with a small cohort of schools who were all taken from a predominately rural English county. It was never the intention to provide a representative sample of all schools within the country. I believe that given the decline of political policy making in this area, and following the demise of BECTA, and the significance of some of the recent changes, that further study around these findings would be useful. A limitation of the study is that the county as a whole is represented by conservative members of parliament. It would be valuable to contrast these findings around improved effectiveness of spending with a much wider cohort of schools. Similarly, it would be beneficial to an understanding of the nature of the fiscal changes to examine the findings that rural schools were spending more than their urban counterparts.

The main challenges faced in this research centred on the number of perspectives that were gathered in relation to the research focus, the logistical challenges around data collection and my positionality in relation to the research setting. If a similar piece of research were to be carried out in future, I would recommend the focus be widened to include an interview with both the head teacher and the senior leader responsible for ICT to allow a conceptualisation that contrasts both views. I would recommend the use of a sample method that created a cluster sample drawn from a wider school population across a range of adjoining counties to allow for a probability

sampling method, as the logistical challenge around a maximal sample would be a significant issue. The only way adequately to address the logistical challenges would be to acquire an external funding stream for the research, possibly from the educational software industry or from a body like BESA.

As I mentioned, it would be useful to conduct a statistical study that probed the correlation between pupil premiums and the changes in the OFSTED grading that have been applied to schools since the government took office. This research could then expand into an examination of the 'effectiveness' of spending on areas around ICT in the curriculum and the difference it makes to results and a school's performance on the accountability framework.

Many of those interviewed were confident and articulate in their knowledge of ICT, but there is a need for a study into whether a trained or untrained senior leader is 'better' at exercising effective leadership of ICT within a school (however that is measured). Conole and Dyke (2004) could comment in the midst of the New Labour spending that little was understood about the affordances of different technologies and how they could be best exploited in different learning contexts. I believe that there is still a need for a more systematic research based grounding around the use of different technologies in teaching and learning. However, as Conole and Dyke point out, the technology available and features which it offers are rapidly changing,

> 'this speed can also raise issues about quality, lack of authority of sources and lack of reflection. The speed of change may also mitigate against reflective and critical thought, fostering surface approaches to learning.' (2004:116)

Any move towards a 1:1 computing model has funding implications. In the county there appeared to be three models or approaches: the first, allowed the parents to purchase any device (or a

school suggested device through an approved commercial organisation) which then worked with the internal systems; the second was based on a co-funded model where the school bulk purchased a large quantity of a given device and then gathered parental support for this as a charitable e-learning scheme; the third, saw the equipment as being bought by the school. Further research into these models would explore how sustainable these systems are in the medium to long term. The first two models mean that schools can outsource a range of their traditional costs for hardware and software. They also imply that the incidence of vandalism by the user is reduced (or is less relevant).

Ian Gilbert after discussing some of the limitations of the current western school system, and the dangers posed by the BRIC nations, talks in Edutopian terms about the liberalisation of knowledge that technology has brought. He sees the smartphones that rest in the pockets of many fifteen year olds and the many opportunities they offer to the teacher. He then says,

> 'In 10-15 years, App enabled phones will be the number one channel through which we receive information. What are the implications of that in your classroom and in your school? For years, teachers have been the primary source of information in the classroom, backed up by textbooks that have been kept locked in a cupboard or guarded by Conan the librarian.' (Gilbert, 2011:24)

An issue with this analysis is that if all the knowledge in the world was accessible on the desk, alongside a method of synthesising and presenting information, then it would present new challenges about what is taught and how it is delivered. It is a vision that would support

Matthew's view about all the softer skills around team work, communication, curiosity, energy and self-belief as likely to be very important. In this viewpoint, students with those skills and tools would not want to start and stop learning when the bell rings and the democratisation of knowledge and learning would be seen as potentially a powerful driver for future educational improvement.

Many schools in this study had adopted the Edutopian narrative that we are hardly equipping students for life in the next century if we only supply them with the same set of pens, papers and library books that we were given. It is hugely important to consider the three models (and any other models that might be suggested) across a much wider national sample. We could then determine whether there is a real difference, based on the economic affluence of the catchment area, regarding the funding approach designed around the use of personal computing devices, and what needs to be considered around these choices. This type of study would be useful as schools seek to move forwards facing the challenge of reducing finances. Those interviewed have retained a focus on doing what is right for the child, but at the same time with the consciousness that, as Luke put it, 'ICT is a hungry dog: once you begin to feed it, it wants more and more.'

Bibliography

Alexiadou, N., (2001). *Travelling Policy/Local Spaces.* Paris, Congres Marx International 111 (Sept).

Angus, L., (2004) Globalisation and educational change: bringing about the reshaping and renorming of practice. *Journal of Education Policy,* 19(1).

Apple M.W., (2001) *Educating the 'Right' Way - Markets, Standards, God and Inequality.* London: Routledge Falmer.

Aristotle, (2005) *Ethics - Translation by J.A.K. Thomson.* London: The Folio Society.

Atkinson, P. & Hammersley, M., (1995) *Ethnography - Principles in practice.* 2nd edition ed. London: Routledge.

Bailey, D., (2010) *Public sector budget cuts could force schools to outsource ICT.* [Online] Available at: www.computing.co.uk/ctg/news/1818477/public-sector-budget-cuts-force-schools-outsource-ict [Accessed 21 February 2010].

Bassey, M., (1999) *Case Study in Educational Settings.* Buckingham: Open University Press.

Beadle, P., (2006) *Not OK Computer - Whiteboard wizards would be better off with a book.* [Online] Available at: http://www.guardian.co.uk/education/2006/nov/21/schools.uk2 [Accessed 17 September 2011].

Beadle, P., (2008) *A step too far - computers are no substitute for the real thing.* [Online] Available at: http://www.guardian.co.uk/education/2008/apr/01/schools.news1 [Accessed 17 September 2011].

BECTA, (2006) *Managing ICT costs in schools - summary sheet.* Coventry: British Educational Communications and Technology Agency.

BECTA, (2006b) *Managing ICT costs in schools*, Coventry: British Educational Communications and Technology Agency.

BECTA, (2007) *Harnessing technology review 2007: progress and impact of technology in education.* Coventry: British Educational Communications and Technology Agency.

BECTA, (2008) *E-maturity in personal and community development learning: review report.* Coventry: British Educational Communications and Technology Agency/SERO Consulting.

BECTA, (2008b) *How do boys and girls differ in their use of ICT*?, Coventry, August 2008, British Educational Communications and Technology Agency.

BECTA, (2009) *Evidence on the impact of technology on learning and educational outcomes.* Coventry: British Educational Communications and Technology Agency.

Bell J., (1993) *Doing your research project – A guide for first time researchers in education and social science*, 2nd Edition, Open University Press, Buckingham

BESA, (2010) *BESA ICT in UK State Schools 2010 Summary Report.* [Online] Available at: www.besa.org.uk/besa/documents/view.jsp?item=1467 [Accessed 21 September 2011].

BESA, (2012) *Press release*: *BESA releases ICT in UK State Schools 2012 research* [Online], Available at: http://www.besa.org.uk/news/besa-releases-ict-in-uk-state-schools-2012-research/, Accessed on 31 January 2013.

Blanchard, J., (2000) *Does God believe in Atheists?,* Wales: Evangelical Press.

Bosley, C. & Moon, S., (2003) *Review of existing literature on the use of Information and Communication Technology within an educational context.* Derby: Centre for guidance studies.

BOT, (2008) David Stow - Faith and Learning: 'Train up a child in the way he should go', *Banner of Truth Magazine,* June(537), pp. 8 - 17.

BOTb, (2008) Education for Time and for Eternity: Lessons from the life of David Stow, *Banner of Truth,* July(538), pp. 13 - 22.

Boyd, W., (2001) *Education between states, markets and civil society - comparative perspectives.* New Jersey: Lawrence Erlbaum Associates.

Bradley, G. & Russell, G., (1997) Computer experience, school support and computer anxieties. *Educational Psychology,* 17(3), pp. 267-284.

Bridges, D., (2003) A philosopher in the classroom. *Educational Action Research Journal,* Volume 2, p. 11.

Brown G., (2006) *Pre-Budget Report statement to the House of Commons*, HM Treasury, London.

Brown, P. D. &. A., (1998) *Doing research. Reading research. A mode of interrogation for education.* London: Falmer Press.

Brundrett M., (2011) Editorial, Education 3-13: *International Journal of Primary, Elementary and Early Years Education*, 39:1, 1-3

Brundrett, M., (2014) Labour proposals for the development of the education system in England: too much, too little or just right?, *Education 3-13: International Journal of Primary, Elementary and Early Years Education*, 42:4, 351-356

Bryman, A., (1988) *Quantity and quality in social research.* London: Routledge.

Buckingham, D, Scanlon M, and Sefton-Green J., (2001) "Selling the digital dream." *ICT, Pedagogy, and the Curriculum: Subject to Change*, 20.

Buckingham D. Willett R. (eds), (2006) *Digital generations – Children, young people and new media*, Routledge, Oxford

Buckingham D., (2007) *Beyond technology – Children's learning in the age of digital culture*, Polity Press, Cambridge

Burton, N. Brundrett, M. Jones, M., (2014) *Doing your education research project*, 2nd Edition, Sage Publications, London.

Butt, S. & Cebulla, A., (2006) *E-maturity and school performance - A secondary analysis of COL evaluation data.* London: British Educational Communications and Technology Agency/National Centre for Social Research.

Carrington L., (2010) Feeling the pinch, *Leader magazine for school and college leaders*, ASCL, Issue 51, September 2010.

Catherwood, H., (1969) *The Christian Citizen.* London: Hodder and Stoughton.

Chalmers, A., (1996) *What is this thing called Science? - An assessment of the nature and status of science and its methods.* 2nd Edition ed. Milton Keynes: Open University Press.

Chen M., Armstrong S., (2002) *Edutopia: Success Stories for Learning in the Digital Age*. San Francisco, Jossey-Bass.

Chowcat, I. et.al., (2008) *Harnessing technology: preliminary identification of trends affecting the use of technology for learning.* Coventry: British Educational Communications and Technology Agency.

Clough, J., (2006) *The personal touch.* Leicester: Association of school and college leaders.

Coalition, (2010) *The Coalition: our programme for government,* Ref: 401238/0510, Cabinet Office, May 2010, London. Accessed on www.gov.uk (20 October 2013)

Cohen, L., (1976) *Educational Research in Classrooms and Schools: A manual of materials and methods*, London, Harper and Row, cited in Bell (1993)

Condie, R., Munro, B. et.al., (2006) *The impact of ICT in schools - a landscape review.* Coventry: British Educational Communications and Technology Agency/Quality in Education Centre - University of Strathclyde.

Conole G., Dyke M., (2004) What are the affordances of Information and Communication technologies?, *Alt-J, Research in Learning Technology*, Volume 12, No 2, June 2004

Cook, D., (1996) *Blind Alley Beliefs.* Leicester: Intervarsity Press.

Cox, M., (2003b) ICT and pedagogy - a review of research literature. *ICT in schools research and evaluation series,* Volume 18.

Cox, M., (2003) ICT and attainment - a review of research literature. *ICT in schools research and evaluation series,* Volume 17.

Cox, M. & et.al., (1999) *What factors support or prevent teachers from using ICT in the primary classroom.* University of Sussex at Brighton, British Educational Research Association Annual Conference - http://www.leeds.ac.uk/educol/documents/00001304.htm.

Crampton, R., (2008) Beta male - regrets: I've had a few. *The Times*, 14 June, Magazine supplement.

Crook, C. & et.al., (2010) *The impact of technology: value added classroom practice.* Final Report ed. Coventry: British Educational Communications and Technology Agency/University of Nottingham.

Cuban L., (1986) *Teachers and Machines: The Classroom Use of Technology since 1920*, Teachers College Press, New York

Cuban, L., (1999) The technology puzzle. *Education Week,* 18(43).

Cuban L., (2001) *Oversold and Underused: Computers in the Classroom*, Teachers College Press, New York.

Cunningham, M. & et.al., (2003) Laptops for teachers: an evaluation of the first year of the initiative. *ICT in schools research and evaluation series,* Volume 19.

Dadds, M., (2004) *Perspectives on Practitioner research.* Lancaster: St. Martins College.

DFEE, (1999) *Survey of Information and Communications Technology in schools 1999.* Norwich: Department for Enterprise and Education.

DFES, (2001) *NGFL pathfinders: preliminary report on the roll out of NGFL programme in ten pathfinder LEAs.* London: Department for Education and Skills/HMSO.

DFES, (2005) *Harnessing Technology - transforming learning and childrens services.* Nottingham: Department for education and skills.

DFES, (2006) Learning, teaching and managing using ICT, *Primary National Strategy*, DFES, London.

DFE, (2015) *Governors' handbook – for governors in academies, maintained schools and free schools*, January 2015, Department for Education.

Dyke M., Harding A., (2007) Big brother in the classroom? The use of cameras as communication not surveillance technology. In, *Computers and Learning* , Dublin, IE. Available on http://eprints.soton.ac.uk/149493/. Accessed July 2015.

Durkheim, E., (2006) *On Suicide - Translation by R. Buss.* London: Penguin Books.

Earl, L. & Stoll, L., (2003) Making it last: building capacity for sustainability. In: B. D. &. J. West-Burnham, ed. *Handbook for educational leadership and management.* London: Pearson Education.

Edutopia, (2014) *Edutopia*, https://www.youtube.com/user/Edutopia. Accessed 01 August 2014.

Eisenhardt, K., (1989) Building theories from case study research. *Academy of Management Review,* 14(4), pp. 532-550.

ERA, (2004) Education Reform Act, in: *Promoting and evaluating pupils' spiritual, moral, social and cultural development.* London: OFSTED/HMI.

Ertmer, P. & et.al., (1999) Examining teachers' beliefs about the role of technology in the elementary classroom. *Journal of Research on computing in education,* 32(1), pp. 54-72.

Erumban, A. & Jong, S. D., (2005) *Cross country differences in ICT adoption - a consequence of culture?.* [Online]. Available at: http://som.eldoc.ub.rug.nl/reports/themeC/2005/05C01/ [Accessed July 2011].

Facer K., (2011) *Learning Futures: Education, technology and social change*, Routledge, Oxford.

Fabry, D. & Higgs, J., (1997) Barriers to the effective use of technology in education. *Journal of educational computing,* 17(4), pp. 385-395.

Foddy, W., (1993) *Constructing Questions for Interviews and Questionnaires: Theory and Practice in Social Research*, Cambridge, Cambridge University Press, cited in Punch (2009)

Fullan, M., (2003) *The Moral Imperative of School Leadership.* California: Corwin Press.

Fullan M., (2013) *Stratosphere – Integrating technology, pedagogy and change knowledge*, Pearson, Toronto

Fullan M., (2014) *The Principal – three keys to maximizing impact*, Jossey Bass, San Francisco.

Fullan, M. & Hargreaves, D., (1998) *What worth fighting for out there.* Williston, Vermont: Teachers College Press.

Gates B., (1995) *The Road Ahead*, London, Viking.

Geehan, E., (1971) *Jerusalem and Athens - critical discussions on the theology and apologetics of Cornelius Van Til.* New Jersey: Presbyterian and Reformed Publishing.

Gilbert I., (2011) *Why do I need a teacher when I've got Google – the essential guide to the big issues for every twenty-first century teacher*, Routledge, London.

Gill, A., (2007) *One step ahead of the game - leading change in ICT in support of pupil learning.* Nottingham: NCSL.

Glyn, A., (2007) *Capitalism unleashed: Finance, globalization and welfare*, Oxford University Press, Oxford.

Gorard, S., (2009) *A case against school effectiveness.* [Online]
Available at:
www.education2.bham.ac.uk/documents/staff/gorard_s/School_effectiveness_paper3.pdf
[Accessed 24 December 2011].

Gothard P., (2012) *DFE explains ICT curriculum disapplication* [online] Available at: http://www.computing.co.uk/ctg/news/2183828/doe-explains-ict-curriculum-disapplication-telling-schools [Accessed 29 December 2012]

Grace, G., (1995) *School leadership: beyond education management - an essay in policy scholarship.* London: Falmer Press.

Grace, G., (2002) *Catholic Schools: Mission, Markets and Morality.* London: Routledge Falmer.

Gray, J., (2003) *Straw dogs - Thoughts on humans and other animals.* London: Granta Books.

Greenfield S., (2014) *Mind Change: How digital technologies are leaving their mark on our brains*. London: Rider.

Guggenheim D., (2010) *Waiting for Superman*, Documentary, Run time 102mins.

Guha, S., (2000) *Are we all technically prepared? Teachers' perspectives on the causes of comfort or discomfort in using computers at elementary grade teaching.* Atlanta, Georgia, Annual meeting of the National Association for the Education of Young Children.

Hacker, P., (1998) *Wittgenstein - on human nature.* A Phoenix Paperback - The Great Philosophers Series ed. London: Phoenix.

Hammersley, M., Atkinson P., (1995) *Ethnography: Principles in Practice*, 2nd Ed., London, Routledge, cited in Punch (2009)

Hargreaves, A., (2003) *Teaching in the Knowledge Society.* Buckingham: Open University Press.

Hargreaves, D., (1996) *Teaching as a research based profession: possibilities and prospects, The Teacher Training Agency Annual Lecture 1996.* [Online]
Available at:
http://eppi.ioe.ac.uk/cms/portals/PDF_reviews_and_summaries/TTAHargreaves_lecture.pdf
[Accessed 30 March 2010].

Hargreaves, D., (2006) *A new shape for schooling – October 2006*, Specialist schools and academies trust, London. Available at: http://www.my-ecoach.com/online/resources/13729/a_new_shape_for_schooling_11.pdf [Accessed April 2015]

Hartnell-Young, E. & et.al., (2008) *How mobile phones help learning in secondary schools.* Coventry: British Educational Communications and Technology Agency/Learning Sciences Research Institute.

Hayek F.A., (2005) *The road to serfdom with the intellectuals and socialism*, Combined Edition, Institute of Economic Affairs, London. Available on http://mises.org/library/road-serfdom-0

Hayek F.A., (2009) *A free-market monetary system and the pretense of knowledge*, Mises Institute, Accessed December 2014. Available on http://mises.org/library/free-market-monetary-system-and-pretense-knowledge

HayGroup, (2012) Building the new leader – 2030, Available from: http://www.haygroup.com/leadership2030/ [Accessed on 31 January 2013].

HC, (2011) The English Baccalaureate - 5th report of session 2010-2012. *House of Commons - Education Committee,* 1(HC851 - www.parliament.uk/education-committee).

Heslop, S., (2007) *Hidden Gold - schools managing knowledge capital during periods of change,* NCSL.

Hill, R., (2008) *Achieving more together - Adding value through partnership.* Leicester: ASCL.

Hiltzik, M., (1999) *Dealers of Lightening - Xerox Parc and the dawn of the computer age.* New York: Harper Business Publications.

Hobson, W., (2010) *School ICT budgets to stay level despite cut fears.* [Online] Available at: www.hardsoftcomputers.co.uk/news/school-ict-budgets-to-stay-level-despite-cut-fears-8349 [Accessed 21 February 2011].

Hollingworth S., Allen K., Hutchings M., Kuyok K.A., Williams K., (2008) *Technology and school improvement: reducing social inequity with technology?*, Institute for Policy Studies in Education – London Metropolitan University, BECTA, London.

Hood C., Emmerson C., Dixon R., (2009) *Public Spending in Hard Times*, ESRC Public Services Programme, Available at: http://christopherhood.net/pdfs/public-spending-in-hard-times.pdf [Accessed 15 August 2014].

Istance, D., (2003) The OECD schooling scenarios, in: B. D. &. J. West-Burnham, ed. *Handbook for educational leadership and management.* London: Pearson Education.

Johnson, D., (1994) *Research methods in educational management.* London: Pitman Publishing.

Jones, A., (2004) *A review of the research literature on barriers to the uptake of ICT by teachers.* Coventry: British Educational Communications and Technology Agency.

Jones, I. & Day, C., (2009) *Harnessing technology: new modes of technology-enhanced learning action research.* Coventry: British Educational Communications and Technology Agency.

Jones, K., (2008) *Education in Britain - 1944 to the present.* Cambridge : Polity Press.

Keats, D.M., (1988) *Skilled Interviewing*, Melbourne, Australian Council for Education Research, cited in Punch (2009)

Kozma, R., (2005) National policies that connect ICT-Based education reform to economic and social development, in: *Human technology - an interdisciplinary journal on humans in ICT environments,* 1(2), pp. 117-156.

Kruse, S. & Louis, K., (2006) Evaluating technology and instructional innovation: when clear findings are not evident, in: *Learning to read critically in educational leadership and management.* London: Sage.

Kuhn, T., (1970) *The structure of scientific revolutions.* 2nd ed., Chicago: The University of Chicago Press.

Layton D., (1995) Constructing and reconstructing school technology in England and Wales, *International Journal of Technology and Design Education*, Volume 5, Issue 2, pp 89-118

Lightman B., (2013) *Keeping pedagogy on track*, Leader magazine, Issue 69, February 2013.

Linde, N., (2000) *Homeschool open house - interviews with 55 homeschooling families.* Montana: WindyCreek Press.

Lipset S M., (1991) *Continental Divide: The Values and Institutions of the United States and Canada*, Psychology Press, New York.

Literacy Trust, (2009) *Research Press Reports: Father involvement and child outcomes.* [Online] Available at: www.literacytrust.org.uk/research/fathersinvolve.html
[Accessed 29 October 2009].

Livingstone S., (2012) Critical Reflections on the benefits of ICT in education, in: Oxford *Review of Education*, 38 (1). pp. 9-24.

Lomax, P., (2002) Action Research, in: M. C. &. A. Briggs, ed. *Research methods in educational leadership and management.* London: Paul Chapman Publishing.

Lowe, R., (1993) *The Welfare State in Britain since 1945*. London: Macmillan.

Manion, L. & Cohen, L., (1989) *Research Methods in Education.* 3rd Edition ed., London: Routledge.

Marx L. & Smith M.R., (1994) *Does Technology Drive History?: The Dilemma of Technological Determinism*, Massachusetts: MIT

McCracken, G., (1988), *The Long Interview*, Beverley Hills, Sage, cited in Punch (2009)

McNeill P., (1990) *Research Methods*, 2nd Edition, Routledge, London.

Miles, M.B., Huberman, A.M., (1994) *Qualitative Data Analysis*, 2nd Ed, Thousand Oaks, Sage, cited in Punch (2009)

Minichiello, V., Aroni, R., Timewell E., Alexander L., (1990) *In-depth interviewing: Researching people*, Melbourne, Longman-Cheshire, cited in Punch (2009)

Morrison, M., (2002) What do we mean by educational research?, in: M. C. &. A. Briggs, ed. *Research methods in educational leadership and management.* London: Paul Chapman Publishing.

Mulford, B. & et.al., (2006) Local school management: does it make a difference?, in: M. Wallace & L. Poulson, eds. *Learning to read critically in Teaching and Learning.* London: Sage Publications.

Mumtaz, S., (2000) Factors affecting teachers use of information and communications technology: a review of the literature, in: *Journal of Information Technology for Teacher Education,* 9(3), pp. 319-341.

NESTA, (2012) *Decoding learning: The proof, promise and potential of digital education*, NESTA, London.

Neuman, W., (2003) *Social research methods: qualitative and quantitative approaches.* London: Pearson Publishing.

NGA, (2015) *A framework for governance – a flexible guide to strategic planning*, January 2015, National Governors Association and the Welcome Trust.

Nisbet, J., (2005) What is educational research? Changing perspectives through the 20th century, in: *Research papers in education,* 20(1), pp. 25-44.

OFSTED, (2005) *Embedding ICT in schools - a dual evaluation exercise.* London: OFSTED.

OFSTED, (2012), *School Inspection Handbook*, available from: http://www.ofsted.gov.uk/resources/school-inspection-handbook-september-2012 . Accessed on 24 December 2012.

Ozga, J., (2005). *Models of Policy Making and Policy Learning - Discussion paper 1 for seminar on policy learning in 14-19 education. 15 March 2005,* London, Joint seminar in education and youth transitions project and Nuffield review.

Ozga, J., (2000) *Policy Research in Educational Settings - Contested terrain.* Buckingham: Open University Press.

Papert S., (1980) *Mindstorms: Children, Computers and Powerful Ideas*, New York, Basic Books.

Papert S., (1993) *The Children's machine: Rethinking the school in the Age of the Computer*, New York, Basic Books.

Passey, D., (2004) *The motivational effect of ICT on pupils – research report*, RR523, DFES, London.

Paton G., (2010) Spending review: schools budget protected, *The Daily Telegraph*, 20 October 2010. Available from http://www.telegraph.co.uk/education/educationnews/8076309/Spending-Review-schools-budget-protected.html . Accessed March 2015.

Paton G., (2011) *Teachers' obsession with technology sees gadgets worth millions sit in cupboards*, *The Daily Telegraph*, 15 November 2011. Available from http://www.telegraph.co.uk/news/9681828/Teachers-obsession-with-technology-sees-gadgets-worth-millions-sit-in-cupboards.html . Accessed on 12 January 2013.

Patton, M.Q., (1990) *Qualitative Evaluation and Research Methods*, 2nd Ed., Newbury Park, Sage, cited in Punch (2009)

Pelgrum, W., (2001) Obstacles to the integration of ICT in education: results from a worldwide educational assessment, in: *Computers and education,* Volume 37, pp. 163-178.

Peters, M., (2001) National education policy constructions of the 'knowledge economy' towards a critique. *Journal of educational enquiry,* 2(1).

Peterson J., (2010) When will energy storage markets transition from bleeding edge to leading edge?, in: *Seeking Alpha*, 15 October 2010. Accessed December 2014. Available from http://seekingalpha.com/article/230176-when-will-energy-storage-markets-transition-from-bleeding-edge-to-leading-edge

Peyton-Jones S., (2013) Simon Peyton Jones on Teaching Computer Science to Kids with the Computing At School Initiative, an interview with Sadek Drobi, in: *InfoQueue*. Available on: http://www.infoq.com/interviews/peyton-jones-cas, Accessed 5th August 2014

Powell, E., (1999) *On Giant's Shoulders.* Epsom: DayOne Publishing.

Prensky M., (2012) The Reformers are leaving our schools in the 20th century, *Digital Natives to Digital Wisdom: Hopeful Essays for 21st century learning*, Thousand Oaks, Corwin.

Punch, K., (2009) *Introduction to Research Methods in Education.* London: Sage Publications.

Quaglia Institute, (*2012) My Voice – National Student Report (Grades 6-12),* Quaglia Institute, Portland. (Cited in Fullan, 2013).

Quinlan O., (2015) *Ed tech - failing on evidence?* #naace15 keynote, Available on http://www.slideshare.net/oliverquinlan/ed-tech-failing-on-evidence-naace15-keynote, Accessed April 2015.

Robertson, S., (2005) Re-imagining and rescripting the future of education: global knowledge economy discourses and the challenge to education systems, in: *Comparative Education,* 2(May), pp. 151-170.

Rosin L., (2010) *Rewired: understanding the iGeneration and the Way they Learn*, St Martin's Press, New York.

Ross, J. & et.al., (1999) Predictors of teachers' confidence to implement computer-based instruction, in: *Journal of educational computing research,* 21(1), pp. 75-97.

Rothbard M. N., (2004) Man, Economy and State with Power and Market, 2nd Edition, von Mises Institute, Alabama. Available on http://mises.org/library/man-economy-and-state-power-and-market

Russell, G. & Bradley, G., (1997) Computer experience, school support and computer anxieties. *Educational Psychology,* 17(3), pp. 267-284.

Russell B., (2004) *History of Western Philosophy and its connection with political and social circumstances from the earliest times to the present day*, The Folio Society, London.

Scrimshaw, P., (2004) *Enabling teachers to make successful use of ICT.* Coventry: British Educational Communications and Technology Agency.

SecEd, (2012) *ICT and the Future of Education – A consensus report from SecEd's latest education symposium*, Ed. Pete Henshaw. Available from www.sec-ed.co.uk.

Selwyn, N. & Brown, P., (2007) Education, nation states and the globalisation of information networks, in: B. L. &. J. Ozga, ed. *The Routledge Falmer reader in education policy and politics.* London: Routledge Falmer.

Selwyn N., (1999) 'Gilding the Grid': The marketing of the National Grid for Learning, British Journal of Sociology of Education, Volume 20, Issue 1, 1999, pages 55-68.

Selwyn N., (2002) Learning to Love the Micro: The discursive construction of 'educational' computing in the UK, 1979-89, in: *British Journal of Sociology of Education*, 23:3, 427-443

Selwyn N., (2004) Reconsidering political and popular understandings of the digital divide, in: *New Media Society* 2004 6: 341-362.

Selwyn, N., (2008) Realising the potential of new technology? Assessing the legacy of New Labour's ICT agenda 1997–2007, in: *Oxford Review of Education*, 34:6, 701-712.

Selwyn N., (2011) The place of technology in the Conservative-Liberal Democrat education agenda: an ambition of absence?, in: *Educational Review*, 63:4, 395-408.

Selwyn N., (2014) *Distrusting Educational Technology – critical questions for changing times*, Routledge, New York.

Senge, P., (2003) Creating desired futures in a global economy, in: *Reflections - The society for organisational learning journal,* 5(1).

Simon, B., (1991) *Education and Social Order: 1940-1990*. London: Lawrence&Wishart. Cited in Jones, 2003.

Sinclair, R. & Mortimer, E., (2007) *Harnessing technology local authorities survey 2007.* Coventry: British Educational Communications and Technology Agency/National Centre for Social Research.

Smith P., (2014) *Gödel without (too many) tears*, 2nd edition revised draft. Accessed December 2014. Available on http://www.logicmatters.net/resources/pdfs/gwt/GWT2f.pdf

Soucek, V., (1995) Flexible education and new standards of communicative competence, in: J. Kenway, ed. *Economising education: the post fordist directions.* Geelong: Deakin University Press.

Sproul, R., (1984) *Classical apologetics - a rational defence of the Christian faith and a critique of presuppositional apologetics.* Grand Rapids: Zondervan.

Stott, J., (1992) *The contemporary christian - An urgent plea for double listening.* Leicester: Intervarsity Press.

Stiglitz J., (1999) *Public Policy for a Knowledge Economy*, Department for Trade and Industry and Center for Economic Policy Research, London, January 27, 1999.

Stiglitz J., (2002) *Globalization and its discontents*, Norton, New York.

Strauss A., Corbin J., (1990) *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, Newbury Park, Sage, cited in Burton, Brundrett and Jones (2014)

Taylor, A., (2000) *England 1914-1945.* London: The Folio Society.

Til, C. V., (1955) *The Defense of the Faith.* New Jersey: Presbyterian and Reformed Publishing.

Til, C. V., (1969) *A Christian Theory of Knowledge.* New Jersey: Presbyterian and Reformed Publishing.

Tinto, V., (2003) *ICT in Education - E-Primers for the information economy, society and polity,* www.apdip.net/publications/iespprimers/eprimer-edu.pdf: UNDP Asia-Pacific.

Treasury., (2010) *Spending Review 2010*, HM Treasury, October 2010, CM7942. Accessed on www.gov.uk, October 2013. Available on www.official-documents.gov.uk

Twinning, P., (2002) *ICT in Schools - estimating the level of investment,* www.meD8.info: MeD8 Report No 02.01.

Underwood, J. & et.al., (2009) *Narrowing the gap: an exploration of ways technology can support approaches to narrowing the gap for underachieving and low-achieving learners in secondary school.* Coventry: British Educational Communications and Technology Agency.

Von Mises L., (1949) *Human Action – The Scholar's edition*, Mises Institute, Auburn. Accessed December 2014. Available for download on http://mises.org/library/human-action-0

Wagner T., (2012) *Creating Innovators: The making of Young People who will change the world*, Simon and Schuster, New York.

Wallace, M. & Hoyle, E., (2005) The myth of transformation, in: *Educational leadership: Ambiguity, professionals and managerialism.* s.l: Sage Publications.

Wilshaw, M., (2012) *What OFSTED want*. Available as a sound file from http://www.thersa.org/__data/assets/file/0009/582606/20120430SirMichaelWilshaw.mp3 a video clip is also available on http://teachingbattleground.wordpress.com/2012/10/13/what-ofsted-say-they-want/. Accessed on 24 December 2012.

Woods, P.H. (1986) *Inside Schools: Ethnography in Education Research*, London, Routledge and Kegan Paul, cited in Punch (2009)

Yang H., (2012) ICT in English schools: transforming education? , in: *Technology, Pedagogy and Education,* 21:1, 101-118

Younie, S., (2006) Implementing government policy on ICT in education: lessons learnt, in: *Journal of Educational Information Technology,* Issue 11, pp. 385-400.

Appendix 1 – The Interview Schedule

Opener - What have you done before this role and how have you come into this role?

Interview Questions

Q1. Can you describe in broad terms the size of the school budget and roughly the percentages that you are putting towards the five largest areas - and then reflect on the effect of any recent changes on your w;'hole school spending decisions?

Q2. In broad terms can you describe how much money the school has been spending on ICT during the last 12 months, and what sort of things have been major investments, and then compare this against the historic spend over 24 months or a little further back?

Q3. Can you describe the effect of any recent changes, on your ICT spending in particular, and how will these changes be seen on a day to day basis?

Q4. How does spending money on ICT fit with your view of what education is about?

Q5. How do you plan your spending on ICT within the school and who is involved in the process?

Q6. What wider influences affect how you spend money on ICT at a whole school level?

Do you feel under pressure from central government, in any way?

Q7. To what extent has your career and personal experiences prepared you for making spending decisions on ICT within school?

Q8. To what extent has the attitude of the government towards the role and use of ICT within schools (rather than as a distinct subject) changed recently? If so, what do you think the effect of that change has been?

Q9a. How do you know that you are getting value for money in your spending on ICT?

Q9b. What factors do you consider when looking at the cost of a piece of software or equipment for a member of staff?

Q10. Can you tell me about you technical support structure and how you rate it?

Q11. Can you describe your most successful ICT spend and reflect on what you feel made it successful?

Q12. Can you describe your least successful ICT spend and reflect on what you feel made it unsuccessful, or not as successful as you would have wished?

Q13. What are your key school priorities in the next year and can you explain how your use of ICT and the data infrastructure in the school affects them throughout the year?

Q14. Do you have a VLE and is it important to teaching and learning?

Q15. Are you involved in any collaboration with other schools, in relation to the use of ICT and tell me the benefits and drawbacks this brings?

Q16. Are there any pieces of new technology, or changes in technology, that you feel will have a significant impact over the medium term on your school and how will you know?

Appendix 2 – A sample of a partial transcript from an interview

Interview with Philip

Opener - What have you done before this role and how have you come into this role?

My current role is assistant head and I came to that role from being a head of department in mathematics at my previous school. My role itself covers looking after ICT (provision within the school and not the delivery of ICT) in requires me to look at where and how we spend money and the resourcing of ICT needs within the whole school environment. The other parts of my job are looking at the timetable and I also look after three departments – the mathematics department, the design technology department and the maths department.

Interview Questions

Q1. Can you describe in broad terms the size of the school budget and roughly the %'s that you are putting towards the 5 largest areas - and then reflect on the effect of any recent changes on your whole school spending decisions?

Do I know? The budget is just under £6m and about 80% of that is staffing (wages) the other big areas are the bills like gas/electricity etc., we have grants for special areas of students needs, we put a lot of provision in for the 6th form in terms of laptops etc (I don't know what % it is) but we are spending £22k-£23k on netbooks for 6th formers, so our ICT commitment there is quite large. Our actual capitation for this year is going to be about £72k on ICT.

Q2. In broad terms can you describe how much money the school has been spending on ICT during the last 12 months and what sort of things have been major investments and then compare with this against the historic spend over 24 months or a little further back?

It is a slightly rising trend. It is not as rising as much as I would want it to be but we have got to budget for replacements. We are on a cycle trying to replace every three to five years and that cycle is now slipping to every six or seven years. So in terms of where we are at, the budget has gone up but it has only gone up 5 or 6k which is not huge as a global figure but our overspend as a school means that we are having to cut back, perhaps harder than we would want to.

Have you made any major investments on ICT recently?

Yes, we have done several but at the same time several other things have come to an end – so we used to have SIMS learning gateway which we scrapped and was costing us £4k to £5k per annum which we are replacing with INSIGHT which is cost £1.5k per annum – giving a lot of saving on that one. We introduced Frog to the school about a year ago but that was a replacement for uniservity. Those are big initiatives but in terms of capitation they are still quite a large fee. In terms of other initiatives - we were looking at bringing

Ipads rather than netbooks to the 6th form we haven't done that yet but we may still do that but at the moment we have the problem that they are not compatible with Frog and it just doesn't support them so that we need it to help students get access to the wider curriculum.

Q3. Can you describe the effect of any recent changes (**from government)**, on your ICT spending in particular, and how will these changes be seen on a day to day basis?

Not necessarily from government, the parent portal has been one major thing that the government have tried to put in place but it isn't mandatory anyway and we haven't really had that up and running properly – so I guess that is the only thing that has come from it. It is our own drive to try to have multi-platforms within school but that brings its own problems so we are treading very carefully and the moment what we are trying to do is to keep the current system up to date rather than continually adding more to it because the cost is preventing that.

Q4. How does spending money on ICT fit with your view of what education is about?

If I was to actually say that in the classroom in terms of teaching and learning the ICT usage has been paramount – it really has. Every single teacher uses it in some form, even using it to project onto the wall images or whatever it happens to be – right the way down to the PE department using ITouches and kids video recording themselves jumping and then going back and analysing their lift off or whatever it happens to be. So for us ICT has a very broad use and it is paramount in terms of the teaching and learning that is going on within the school and is central to that.

And presumably you have projectors in classrooms and things like that?

We have projectors in every classroom and we have interactive whiteboards in pretty well every one. I think the interactive whiteboards have been our biggest waste of money – most staff use them as a projector screen or background and you can do that in other ways so from our point of view – if those fail we will keep the projector but not the board. We have a computer in most classrooms for lesson registration purposes – we take a register every lesson and that information goes through and we use the behaviour management module within that so that we have a response from senior leaders to support the teacher. We have got ICT suites in school, we have five at the moment and they are fully fully used. We have a library decked out with computers and again it is fully used, especially at breaktimes and lunchtimes.

So as a tool the kids use it, the staff use it, it is part and parcel of everyday life. One of the new things we have had to do recently is to upgrade the Windows which was running on 2003 and we have now gone to Windows 7. So that has been a big change and bringing Microsoft Office up to date and that has brought issues with compatibility outside – so all that has been a set of big changes for the school.

Q5. How do you plan your spending on ICT within the school and who is involved in the process?

Basically, in terms of planned spend – I work very closely with the finance lady in our place and the allocation of it comes down to what I do with the network manager. We look at the server and things like the wireless system where we check if it is uptodate and whether we can keep it running properly at the right speed. We will look at the rolling programme and see what is coming to the end of its useful life and look at replacement and then on top of that I will have a discussion with the faculty leaders to discuss with them what requires they have got. I have an ICT steering group where we discuss things, it is made up of the network manager, myself and also a representative from the ICT department itself. So within that we can look at the ICT, where we are taking it, what we are doing with it and that is basically it.

So following on from that how much of your £70k is spent on keeping the existing system going and how much is spend on new things?

For example, we have just put in an order for some new desktop machines to replace kit and that has just come to £32k so that will give you an idea of the magnitude of the spending. We have done a lot of work on the server and infrastructure and spent about £30k on that. We have looked a blade servers and possibly going to a virtual system so that has got to be budget for in the future. So yes, in terms of the money, the majority is going on replacing the existing structure itself and I don't really want to add to that – we can barely afford to keep it running as it is without expanding it in any shape or form.

Licenses is the other thing that we spend quite a lot of money on it gives a big software overhead.

Q6. What wider influences effect how you spend money on ICT at a whole school level?

Difficult one! The potential of what I think ICT could do, was helped by a conference I went to down in London about 12 to 18 months ago which was a Labour frontis conference and it became very evident when I was on that how much we could under use the technology that was in schools – whether it was the mobile phones that the kids were walking around with or the natural structures that we already had in place. As a teaching tool ICT is exceptionally fluid, new devices come along all the time, like the iPad with the level of integration within the classroom is fantastic. I have seen a trial of some of them within the maths department and the kids have been using them and the engagement has been through the roof and it has been fantastic – but, maybe that is just the novelty value. The netbooks are used very extensively by the 6th form – where every lesson they are required to use them to access information via the webor the Frog servers to actually use within the lesson environment. So for me it is to see where the technology can support teaching and learning – I don't think that we are anyway close to where we could be, in terms of its use. My head is a total ICT phobe and for him it is like a necessary tool rather than an exciting tool and I just think it has marvellous potential in terms of what you can actually do with it.

Q8. To what extent has the attitude of the government towards the role & use of ICT within schools (rather than as a distinct subject) changed recently? If so, what do you think the effect of that change has been

I don't know that it has changed particularly – the way that country has changed in terms of direction has been going back to old fashioned ways. In terms of the bigger picture the government don't mind what you do – we are doing two different things. We have a lot of independence with the school environment now, in terms of what we want to do with ICT. It is up to us to choose to deliver a course and it is up to us about how we do that, so from that point of view I don't think their influence is that great. I don't feel pressure from government in terms of spending in any particular way.

Q9. How do you know that you are getting value for money in your spending on ICT?

That is a really good question – I know we get value for money in terms of the usage we get out of technology – that is easy enough to measure because you look at how much did you buy it for and how did you keep it serviced etc. Buying a higher specification and checking that it lasts longer than it would if we had bought a cheaper one etc. That is one area that you can measure.

In terms of usage you can do some small studies and we have used the ICT department to actually do that to monitor what is happening and the traffic that is going across the system what is being used and what is being done on it. We know the system is being used and that it is very extensive, so the number of hits that we get on Frog.

Another thing the ICT department have looked at is attitudinal surveys on for the pupils to find on their view on their use of ICT, what have they used it on and what would they like to use it on. All this is resoundingly positive and they want to use it even more actively that they do at the moment but there are also limits to the resources that we have got. When asked the question 'do you use ICT in lessons?' we get a very poor response when it is a survey about what the teachers are doing rather than them as all ICT should be related to just them rather than it going on in front of them, I think that is quite a telling thing we know how ICT is being used from observations and we know that it is going on all the time – and some of that is anecdotal, some of it is attitudinal, some of it is the surveys, some of it is observations, some of it is the traffic. Is it value for money – if it wasn't there would we need it and could other ways be found around it, possibly, what still gets to me is that we are still printing off who knows what, our photocopying bills don't seem to be going down despite the investment in the technology and delivering a course without a textbook. The A Level has happened and the expenditure on A Level textbooks has gone down and we are spending the money putting things on the system rather than books and so on. I guess it is more value for money in 6th form and that is because it is so extensively used and they take the little netbooks to lesson every time.

Appendix 3 – Ethics application

Direct Line : 07973 669654

Email: a.r.middleton@ippm.keele.ac.uk

Information Sheet

Title

An investigation into decision making within secondary schools on Information and Communications Technology inside the same Northern county of England

Overview

This study is a piece of practitioner based research into how schools and academies within a single county in the North West of England conduct decision making when managing budgets around Information and Communications Technology (ICT). The research is significant given the size of spending on ICT within secondary schools and the shift of emphasis from a heavily centrally planned ring fenced funding system to one that is devolved to the local level.

Research questions

The research will examine how schools within the same county conduct decision making when managing budgets around ICT. Within this focus there are several strands: firstly, who makes the ICT spending decisions; secondly, what processes and priorities are used within that decision making; and thirdly, what affects those decisions. In looking at the influences on the decisions I will need to examine how decisions are affected in a climate of reducing finances and the wider political dimension around institutional decision making. In order to make the study achievable, I have elected to restrict my research to the secondary schools in the county in which I work.

Aims and scope of the study

The study aims to examine schools' decision making when involved with the management of budgets around ICT, and to develop this understanding within the three different strands identified. The research will explore the thinking of staff making local decisions and will draw on interviews with the head teacher (or an alternative member of the leadership team) to gather their reflections on this process. This research is about the actual processes involved in decision making by head teachers and designed to present these processes in their own words and from their own perspectives, which will allow for the identification of different practices and a measurement of the amount of professional capital being employed in the decisions. The power relationships that underlie the decision-making process give a vital dimension to these relationships and the study of these factors will allow for a clearer picture of the lived reality in the schools.

Invitation

You are invited to take part in the study **An investigation into decision making within secondary schools on Information and Communications Technology inside the same Northern county of England**

Why have I been chosen?

You have been chosen because you are the head teacher of a school in this county, or your head teacher has given your details as the person best placed, within the school, to comment on the leadership of issues relevant to spending and decision making on ICT.

Do I have to take part?

You are free to decide whether you wish to take part or not.

Who else will be asked to take part?

Secondary schools and academies in this county are being asked to participate.

What will happen if my school takes part?

If you agree to take part in the research you will be asked to sign the attached consent forms. One is for you to keep and the other is for my records. Once you have given your consent, I will consult with you to arrange an interview time and this will last for approximately 40 minutes and will be conducted at your school or a venue of your choice. I intend to begin the process of writing up the findings in summer 2012, it may then be necessary to ask you for a follow-up interview to clarify any aspect of the initial interview where I am uncertain about your views. I hope that this follow-up interview will not be required, but it would take place before Easter 2013.

What are the benefits (if any) of taking part?

This study is designed to inform and improve practice across the county by improving our understanding of the processes followed in a range of environments.

It should help schools within the county gain an understanding of the decision making followed in each of their localised contexts, and thereby supply ideas for reflection on their own practice. The benefits of this shared understanding should repay the time given by each school as an investment in the research process. BECTA, in the publication - *Managing ICT costs in schools - summary sheet, 2006,* Coventry, commented that it was extremely useful for schools to gain an understanding of cost information, to allow leaders to manage proactively.

What are the risks (if any) of taking part?

There are no anticipated risks associated with the study. However, if you are affected by the research in any way then you are able to withdraw at any time.

What sort of questions will I be asked?

In the interview I will ask you about the size of the budget that you are devoting to ICT and how this has changed in recent years. I will also ask you about any practical technologies that you feel have had a direct impact on your school. I will then explore the effect of investments in ICT on the day to day operation of the school, and ask questions such as, How do you plan your spending on ICT within the school and who is involved in the process? or, How does spending money on ICT fit with your view of what education is

about? I will conclude by asking about how your background and experiences have affected your views on ICT spending and some questions about your perception of the role of government in this process.

How will information about me be used?

Data will be collected through digitally recorded interview discussions. The information obtained will be anonymised and used to inform publications in the published doctoral study. The information may also be used in future publications.

Who will have access to information about my school?

Any interviews conducted will be taped, using a digital voice recorder. The digital recordings and transcribed data files will be stored in accordance with the British Educational Research Association's guidelines on a computer with password protection. Once the research has been written up all copies of the recordings will be deleted. The transcripts will only be available to myself and my supervisor. The anonymised transcripts will be retained for five years and then destroyed. All of the data collected will be anonymised and so no participant (including the school and also the individuals who take part) will be identifiable.

What if there is a problem?

If you have a concern about any aspect of this study, you may wish to speak to the researcher who will do his best to answer your questions. You can also contact the supervisor at the University, Dr. Farzana Shain, the Programme Director for the Professional Doctorate in Education. Dr. Shain's email address is *f.shain@keele.ac.uk*.

If you remain unhappy about the research and/or wish to raise a complaint about any aspect of the way that you have been approached or treated during the course of the study please write to Nicola Leighton who is the University's contact for complaints regarding research at the following address:-

Nicola Leighton
Research Governance Officer
Research & Enterprise Services
Dorothy Hodgkin Building
Keele University
ST5 5BG
E-mail: n.leighton@uso.keele.ac.uk
Tel: 01782 733306

Direct line: 07973 669654
a.r.middleton@ippm.keele.ac.uk

Research into school decision making on Information and Communications Technology

Dear Head Teacher,

I am writing to ask whether you are willing to take part in the above named study. I am a doctoral research student at Keele University.

The attached **Information Sheet** gives further details about the aims of the project and what your participation would involve should be willing to take part in the research. Please do not hesitate to contact me (07973 669654 or by email on a.r.middleton@ippm.keele.ac.uk) with any queries or concerns that you may have about the research.

If you are happy to be involved in the research you can let me know by telephone: 07973 669654 or by completing the attached **consent form** and returning it to me by post to:

Andrew R. Middleton
Knutsford Academy
Bexton Road
Knutsford
WA16 0EA

I aim to follow up this letter with a telephone call to you in a few weeks' time at which point I will try to arrange an appointment, so that I can conduct a face to face interview with either you, or if you consider it necessary a more appropriate member of the senior leadership team.

Yours faithfully,

Andrew R. Middleton
Keele University
Keele, Staffordshire, ST5 5BG

Encl: 1) Information sheet 2) Consent form

May 2012 - Version 3

Appendix 4 – Ethics approval

Keele University

RESEARCH AND ENTERPRISE SERVICES

16 May 2012

Mr Andrew Middleton
14 Mulcaster Court
Haslington
Crewe
Cheshire, CW1 5WF

Dear Andrew

Re: 'An investigation into school decision making on ICT in East Cheshire'

Thank you for submitting your revised project for review.
I am pleased to inform you that your project has been approved by the Ethics Review Panel.
The following documents have been reviewed and approved by the panel as follows:

Document	Version	Date
Application Form	1	16/5/12
Summary of Proposal	4	May 2012
Letter of Invitation	3	Mav 2012
Information Sheet	3	May 2012
Consent Form	1	8/3/12

If the fieldwork goes beyond the date stated in your application (31 December 2012) you must notify the Ethical Review Panel via Michele Dawson.

If there are any other amendments to your study you must submit an 'application to amend study' form to Michele Dawson. This form is available from Michele (01782 733588) or via http://www.keele.ac.uk/researchsupport/researchethics/

If you have any queries, please do not hesitate to contact Michele Dawson in writing to m.dawson@uso.keete.ac.uk
Yours sincerely

M. Dawson

Dr Jackie Waterfield rp
Chair – Ethical Review Panel
CC RI Manager, Supervisor

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