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The Capacity of ICT to Transform Teaching and Learning: A Critical View from Within a Building Schools for the Future Project

REPORT

by

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Abstract

Announced in 2003, Building Schools for the Future (BSF) was New Labour's attempt to revolutionise secondary education in the UK, both in terms of infrastructure and pedagogy. The *country's school building stock was decades (and in some cases centuries) old and in poor repair,* built for a different age with a history of lack of investment in modern technologies. BSF was to change all that with massive investment and plans to transform teaching and learning. The new buildings were to be of contemporary and revolutionary design more akin to modern office spaces than their Victorian predecessors. Each school project had £1,400 per pupil (approximately £1.4m) of *its budget 'ring fenced' to be spent on Information Communication Technology (ICT), as this was to* be a major transformational tool; the key to equipping students with the skills needed for a 21st Century economy. This Doctorate report is written from within one of the first BSF projects in the country, planned from 2005 and opened in 2007, with the ICT contract coming to an end in 2014. The author is the only surviving member of the original BSF planning team still working within the LA as a Deputy Head Teacher.

The main research questions 'To what extent and in what ways has the huge investment in ICT during BSF transformed teaching and learning and what was the perspective of this from the three main stakeholder groups; *those leading, those teaching and those learning?'* sets out to investigate the impact of the ICT component of BSF, it does however also reflect on the BSF process as a whole because this set the context in which the ICT systems were deployed; through a Managed Service Provider (MSP) procured from the private sector. This contract cast a long shadow over the prospect *of transformation as BSF became largely about procurement, contracts and cost, the 'B' prevailed;* teaching and learning were marginalized. Another major influence was that the schools in BSF re-opened in the same educational climate of accountability, curriculum, timetables and assessment methodology as they had had in their old accommodation. Conflicting government policy streams only served to make this more evident. Teacher and pupils assimilated their new environments and continued as before.

That is not to say the ICT did not have an impact; there were many positive outcomes ranging from a greatly reduced pupil to device ratios and multimedia lesson content readily available to all. Pupils in particular were delighted (initially at least) with their new environments. Communication and the sharing of ideas and resources were the result of modern networks and systems that meant efficiencies for some and up to date information for most.

Overall, classroom teachers had little capacity to transform their professional lives with the ICT provision, and there was no real pressure for them to do so given the unchanged nature of the structures of education within which they worked. Although many saw the potential of the new ICT, the opportunities to improve their skills were frustratingly lacking or not suited to their needs, consequently most incorporated the ICT into their classroom practice at a level with which they were comfortable.

The cancellation of BSF in 2011 was one of the first acts of the new coalition government, although the schools included in this work had a managed ICT service that ran until August 2014. At the end of this contract schools were left with both expensive change and refresh costs that were likely to be a financial burden many could ill afford and so they were hindered in their ability to embrace newer technologies that might assist transformation.

Glossary

BECTA	British Educational Communication and Technology Agency. The government 'quango' created to advice schools on the use of ICT in schools, funded by the DfE
BSF	Building Schools for the Future; the name given to the British government's investment programme in secondary school buildings in England.
MSP	Managed Service Provider. The private company contracted to install and manage the ICT component of BSF, using the BSF capital and monthly revenue from schools.
NGFL	National Grid For Learning. Government-funded gateway to educational resources on the Internet. It featured many individually selected links to resources and materials deemed to be of high quality. The NGfL was specifically set up to support English schools; separate 'grids' were set up for schools in Northern Ireland, Scotland and Wales.
NoF	New Opportunities Fund. Paid for through lottery funding; training to raise the standard of pupils' achievements by increasing the expertise of serving teachers in the use of ICT in subject teaching.
Ofcom	The Office of Communication; the government-approved regulatory and competition authority for the broadcasting, telecommunications and postal industries of the United Kingdom.
RaiseOnline	Online document produced annually by DfE. Analyses individual school performance against national norms for all groups and sub-groups of children. Results are rated as in line with, above or below expected.
PFI	The Private Finance Initiative (PFI) was announced in the 1992 Autumn Statement with the aim of achieving closer partnerships between the public and private sectors. It was one of a range of policies introduced by the Conservative Government to increase the involvement of the private sector in the provision of public services.
PfS	Partnerships for Schools. Government quango set up to manage BSF.
PPP	Private Public Partnerships. The overarching description of public sector projects funded by a combination of private sector and government funding, PFI is a example.

1 Chapter 1: Introduction

1.1 Political Context

Building Schools for the Future (BSF), initiated by the New Labour Government in 2003 was aimed at delivering what they described as the 'transformation' of teaching and learning, through the rebuilding of every secondary school in England and Wales. These new schools were to be of contemporary design, with 'learning environments' replacing classrooms and built to meet the supposed needs of 21st century students. The Information Communication and Technology (ICT) [1] component of the initiative was to be key to that transformation. If 'Education, Education, Education' was New Labour's mantra then BSF was to be its tangible manifestation. The promised funding (£55bn) was unprecedented, the projected timescales short by any standard let alone for a project of this size and the expectations of its impact huge.

Such was the political pressure for early success stories, BSF was to be rolled out in 'Waves', with 'Wave 1' including 'Quick Win' schools that could be rebuilt or refurbished within 2 years. My own professional position placed me in the path of this 'Wave 1' and the expectations of a 'Quick Win'. From 2005-2009 planning took place locally and nationally for further waves of BSF. However, even in its earliest days the programme became increasingly behind schedule as development continued, all be it with increased financial constraints and questions being asked about affordability.

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[1] The following definition is taken from the guidance in the QCA Schemes of Work for ICT: "Information and communications technologies (ICT) are the computing and communications facilities and features that variously support teaching, learning and a range of activities in education".

Of the eight schools in our Wave 1 BSF programme (referred to here as 'The Partnership'), the average spend on ICT was £1.4m per institution. The expectations of Wave 1 of BSF investment were daunting, they required schools to procure an outsourced ICT component of the investment (in this Partnership a capital sum of £12m and a revenue stream for the provider of £1m per year over the 5 years of the contract), to a Managed Service Provider (MSP). I was appointed to join the working party tasked with drawing up the Partnership's ICT specification and selecting the provider (P1.2). Following the awarding of the contract I continued to work with the Partnership (P4.3) thanks to a two day per week secondment, to develop their relationship with the MSP, and in particular the use of the Learning Platform (or VLE).

All of the schools in the programme are now at the end of their 5 year MSP contract and this work gathered data over that time. Since starting this work the political climate has changed significantly. One of the first acts of the incoming coalition government of 2010 was to cancel the BSF programme as part of their reduction in public spending. This was before many Wave 2 projects had got beyond the planning stage.

1.2   Professional Reflection

My career started in 1975 in a totally technology free environment. A friend with whom I graduated studied computer science in a world of mainframes, punched cards and tapes. The OHP (Over Head Projector) was a classroom innovation. One school video recorder, with 'Betamax' tapes arrived in 1976. We booked it to watch recordings of a BBC educational broadcast (assuming the recording had worked).

The single 'Commodore Pet' was taken out of its box in 1978; 64k of memory, a tape drive and a price tag of £800, on it we ran models of Mendelian Genetics, the results announced by a 'beep'. The emerging 'microcomputer' of the 1980s created the Sinclair range and the politically sensitive decision, considering the number of other private companies bidding for the contract, that allowed the BBC to market its own 'micro', with a series of programs (of both the TV and computer variety) to support teaching and learning. Projecting sales of 12,000 they sold 1.5 million. We had two; they continued to run simulations, measure velocity and

calculate dietary requirements for over 15 years. By 1990 our first true 'network' was installed; an 'RM Nimbus' suite of 24 computers running the first Microsoft Windows applications. I embraced every step of the technology evolution and have never doubted the potential of ICT to transform all aspects of our lives. As an 'early adopter' both professionally and privately, from email and mobile phones to iPad, it would be at my desk that the first use of the latest technology was experienced by colleagues and friends alike.

My own experience with ICT in teaching has therefore had a long gestation, from the very first data-logging PCs in science to embryonic classroom networks and the introduction of school Management Information Systems (MIS), my faith in the fact the computer technology can play a key role in all aspects of education remains undiminished. However, until BSF, the story has always been one of limited funding and in my opinion, poor vision within the education sector, unable to keep pace with technological advancement. Schools were always playing catch up or having to accept that the majority of what the business world could access, schools could not, largely through lack of capacity and investment. This, along with an embedded pedagogy that presented an inertia many reforms have (and still do) struggle to overcome will be explored in this work.

Having progressed to school leadership it was my involvement with the Specialist Schools Trust (SST) movement that first introduced me to working with major central government initiatives. The Specialist Schools programme had a slow gestation but by 2003 any school that considered itself worthy of mention had to achieve a specialist status of some description. Obviously the £25,000 capital grant and £125 revenue per pupil per annum awarded directly to Specialist Schools was an incentive to seek the award. The Head and I wrote our application, we negotiated sponsorship and were successful in 2004. Evidence that all that work and investment has had an impact remains inconclusive (Taylor & Bradley, 2007). However, for us the money was to be welcomed, particularly in addressing the history of underfunding the previous 10 years had offered; I planned to channel as much of it as possible into ICT infrastructure. At the same time we became a 'Gateway' for the new Diploma in Creative Media[2] and I became responsible for the introduction of this qualification

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[2] The Diploma of this design was withdrawn by QCA in 2011, only two cohorts successfully completed the course.

that was to be brokered by us across the city. The structure of this award was intended to break down existing curriculum and assessment structures allowing pupils the flexibility and independence to learn for themselves and demonstrate their progress in a number of ways. This curriculum innovation was supported by extra SST (Specialist Schools Trust) capital.

David Milliband stood at my left shoulder waiting to make his entrance as a junior education minister and guest speaker at the SST conference in Hammersmith, 2005. We (myself and the Head Teacher) were there to be accepted into the SST family as our application to become a Specialist Performing and Visual Arts College had been accepted. The main content of his speech focused on the fact that he had to rush off to the House of Commons to launch the BSF programme. What the rest of the audience did not know was that 9 of our LA schools were about to be in 'Wave 1' of BSF and my Community School was the first school in the project. With a budget of £11.5m and £1.4m of that destined for ICT the SST funding became insignificant. Nominated by my school to sit on the BSF planning group, I am now the only surviving member of the first meeting in December 2006 (P1.2, P3.1) still working within the LA. As such I lived and breathed our BSF projects from an LA strategy level, through school leadership right down to (my own) classroom level. From day one, I represented schools at 'Way Forward' meetings (P1.3) that monitored and guided the development of the ICT service. As the programme came to an end in 2014 I sourced alternative solutions and organized market testing seminars to help schools in their decision making. As Local Authority management structures are being dismantled, encouraging schools to become totally independent and seek their own support and advisory structures (my own school acquired academy status in November 2012) and as the LA begins to develop a strategy for a 'Digital City' the technology team at the City Council have turned to me for the input from the education sector.

This work then is a reflection on my 8 years of involvement in BSF from the first planning meetings (P1.2) to the end of the managed ICT contract in 2014 (P4.5-10).

1.3   Embryonic Study

When I embarked on a survey (two years before this work was proposed) in order to assess the impact of the ICT component of our BSF investment I did not know it at the time that I was sowing the seeds of this work. I conducted the survey (P2) in 2007, just after our official BSF opening (see 3.4.1) and prior to the implementation of the managed service contract. The design included three main elements:

1. Observations by Senior Leadership Team (SLT) members: This involved a visit to each department by a member of SLT, for 2 periods, one at each Key Stage. In each hour as many lessons as possible were visited and records made of ICT use on an agreed check list. 74 lessons were visited (P2.3). SLT members were also encouraged to visit the Independent Learning Centre (a large space, equipped with 70 computers that supported independent study) and note their observations.

2. Pupil Survey: A questionnaire issued and completed during a tutorial session. 757 pupil questionnaires were returned. (P2.2)

3. Staff Survey: Also a questionnaire issued and completed during an INSET session. 52 teacher and 22 support staff questionnaires were returned. (P2.1)

The results were largely positive in respect of the impact of the ICT component although there was no attempt to identify or quantify the concept of transformation at that point. A full report, with suggested actions was produced and shared (P2.4). Teachers had coped with change and could see many advantages to the use of ICT, they had all been given a laptop with a comprehensive software installation; they had a desktop and interactive tablet in their own (and every other) teaching space. Two full time technicians and a teacher designated as' eLearning Manger' were available for support. A member of the Senior Leadership Team (myself) was to continue to develop the ICT strategy and oversee the operational management. A new Management Information System (MIS) allowed for electronic registration access via the internet from any remote location, including home and all staff had a new 'webmail' account.

Consequently, the benefits noted initially were largely around procedures, processes and availability. Few found the ICT as yet having an impact on teaching pedagogy but most thought it made them 'more productive' in that ICT systems allowed for greater efficiencies in the use of their time. Collaboration with colleagues was much easier and quicker; the use of email and shared computer storage all brought with them real time sharing and communication.

However, it was obvious there was a confidence divide within the teacher population. Many teachers were not reticent in expressing their feelings of being de-skilled, while pupils who were hugely positive about their new ICT rich environment, were able to explain their own observations of a range in teachers' ability to deal with the new technologies. This resulted in the design of a CPD programme, with sessions run by 'school champions' based on staff need (P4.1). The initial programme ran for 2 years and evolved into a comprehensive CPD scheme. Although this work evolved from the earlier study, that was not its original intention and consequently its design was not totally suitable as a pilot study. However, as well as producing its own valid outcomes it did stimulate the thinking that lead me to this work and crucially it underlined for me the limits of quantitative methods, as highlighted by Onwuegbuzie and Daniel (2003) and the need for more high quality qualitative data that relies upon 'reflexive analysis of values and interests and how they affect different groups in society' (Flyvbjerg, 2005, p.39).

Much of what was contained in my report of 2007 mirrored the findings of the ICT Test Bed Project (Somekh et al., 2007) which is discussed in 2.1 below, but more importantly I felt motivated to develop my own research and this work is the result. Ten years of my professional life was devoted to BSF. My unique experience from within the project placed me, I hoped, in a position to reflect on the process and offer a critical reflection, an approach that has both support and value, according to Larrivee.

> *'Critical reflection is not only a way of approaching teaching it is a way of life. The more teachers* explore, the more they discover. The more they question, the more they access new realms of possibility. The path to developing as a critically reflective teacher cannot be prescribed with an *intervention formula. The route cannot be pre planned, it must be lived'* (2000, p.306).

1.4   Rationale and Aims

As we moved to the end of the first year in an open BSF organisation I was drawn back to the stated aim that teaching and learning would be 'transformed' and the significant role ICT was predicted to play in that process. I wondered if Partnerships for Schools (PfS) had planned evidence gathering and research programmes to identify successes so as to inform future 'waves'. As if my thoughts were being read, I received a call (in 2007) from a PricewaterhouseCoopers' researcher asking me to take part in a study they were conducting on behalf of the Government, into schools' experiences of BSF. The results were to be

published in the first of three 'annual' reports (PricewaterhouseCoopers LLP, 2007). What struck me was they collected evidence at a largely strategic level; teachers and pupils experiences were hardly sought (see 3.2). This pattern was repeated in their next two reports (2008; 2010), I was the only person interviewed in all three surveys, the last one by telephone. I felt there was a major omission in their methodology if this was the definitive instrument being used to assess the impact of BSF. Consequently, I decided to find out for myself by working with three schools from our 'Wave 1' partnership and ask the question;

> *'To what exte*nt and in what ways has the investment in ICT during BSF transformed teaching and learning and what was the perspective of this from the three main stakeholder groups; those leading, *those teaching and those learning'?*

Therefore I embarked on this study to support my own reflections and acquire sufficient data to compare the hopes and aspiration of Head Teachers, made explicit in the vision statement (P1.1) that all schools were required to submit to PfS, with the lived experience of pupils and teachers and add this to my own personal experience. At the planning stage it was expected that my contribution would be to help future developments (i.e. Wave 2 and 3 in my own Local Authority) learn from the experience of 'Wave 1' and improve their chance of true transformation. The cancellation of the BSF programme undermined that possibility, so much so that not continuing with this work was an option I considered. However, without the bureaucracy and external controls of BSF, schools wishing to use ICT to transform teaching and learning are now forced to become increasingly autonomous in their approach. The findings of this work will therefore I believe, be valuable to individual institutions as central (and indeed) local government withdraw their support to schools and expects them to be autonomous organisations.

In 2011 Mahoney et al reflected that *'the programme (BSF) is sufficiently advanced for serious research to be both possible and essential'* (2011, p.356) and Burke reaches the conclusion that her research;

> *'suggests that current efforts to visualize schools as transformational and transformed learning* environments might profit from the notion of prosopography in the sense that it may help our understanding of contemporary networks that are engaged in constructing a common vision of school for the twenty-*first century'*. (Burke, 2010, p.78)

It is my intention that this work, a combination of research and reflections on my own experiences, will add to the debate. My original intention was make a significant contribution to future waves of BSF. That

opportunity having been removed, I have since channelled my energies into supporting schools who, without the support of an LA or government agencies, begin to develop their next phase of education technologies. On a wider scale I feel my reflections on the implementation of a central government policy, through my roles at regional strategy level, school senior leadership and classroom teacher, can add to the evidence base that will guide future strategies.

1.5   What is Transformation in an Education Context?

- To change the form of; to change into another shape or form; to metamorphose.
- To change in character or condition; to alter in function or nature.
- To undergo a change of form or nature; to change.
  (OED, 2014)

Generic dictionary definitions refer to 'radical change' but are only specific in mathematical and genetics context (along with those of Victorian theatre stage design). The business world seems clearer in its understanding and provides a framework that could with hindsight, have helped BSF, particularly as schools are increasingly being asked to embrace commercial ideology. Transformation here is defined as a fundamental change to the way business operates, be it a change in appearance from the customer perspective, a change in the shape of what the business should do or a change in the form of the way in which the business works by embracing new organizational structures, skills process and technology. Draper et al summarise the problematic nature of applying the concept of transformation to an educational context as they reflect on the expected impact of the introduction of VLEs and illustrate the dilemma when the term is used in a simplistic way:

> "Transformation" is a rhetorical, not an objective, term used by those wishing to draw attention to the large size and rapid pace of some change. We have examples where there seems to be vivid transformative change, but on closer inspection, not: whether a fashion change in hair colour (same old heads underneath) or a required policy of teaching with VLEs yet in fact only lectures slides are mounted in it. However similarly we have seen cases of real change (mobile phones, e-journals on the web) where the users (unlike the providers) seldom say their life has changed: they just use what is there. Transformation is a perception, and stakeholders seldom share it. (2006, p.1)

Despite having repeatedly stated transformation in its aims, Partnerships for Schools (PfS) did not try and offer advice about transformation from their perspective until late in 2008, which was nearer to their demise

than inception (Partnerships for Schools, 2008). There is little practical detail, although as Figure 1 illustrates they do accept a difference from, but connection between, the building and education strands of BSF and in doing so they appear to anticipate two different aspects to transformation.
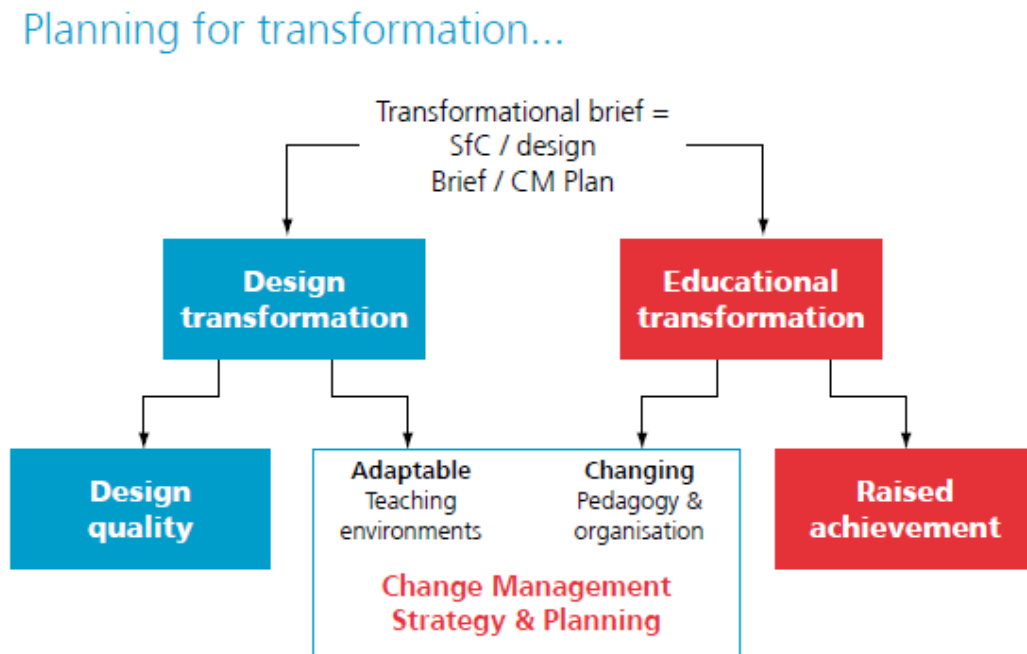
Figure 1: Planning for Transformation (PFS)

There are two interesting observations to be made here. Firstly the educational strand is clearly linked to 'Raised attainment' and secondly a quite explicit reference to change, and more importantly 'changing pedagogy and organisation'. Both of these issues will become themes throughout this work.

In his introduction to a 'Future Lab' report on BSF, Lord David Putnam points out:

> 'The language of transformation pervades all the main policy documents that introduced the (BSF) programmes. Whether transforming services to support the delivery of the Every Child Matters agenda and t*he Children's Plan, or to embed a new approach to learning and its organisation* through personalisation, the underpinning policies call for significant systemic change'. (Putnam, 2008, p.3).

In doing so he emphasises the rhetoric of transformation pervasive in BSF literature and expresses his opinion that changes need to be deeper and more systemic than BSF had considered. In the same report, Rudd expands on this need for systemic change and gives a more detailed expectation than can be found in the whole of the

output from PfS, focusing particularly on his view of how a move to learning communities might be transformational;

> *'*We can only really say transformation will have been achieved if we see marked changes in approaches to learning, teaching practices, relationships and school organisation; when we see a *fundamental shift away from what might be described as schools as 'learned institutions' to the development of 'learning communities' where wh*at is learnt, by whom, when, who with and how becomes more fluid, emergent and evolves based on need and opportunity*'. (Rudd, 2008, p.5)

In his work 'Pedagogy of the Oppressed' Freire takes this further when he see education either controlling or liberating, depending upon whether the state or the individual are at the centre.

> *'Education either functions as an instrument that is used to facilitate the integration of the younger* generation into the logic of the present system and bring about conformity to it, or it becomes "the practice of freedom," the means by which men and women deal critically and creatively with reality *and discover how to participate in the transformation of their world'.* (2000, p.34)

It could also be accepted that if schools are 'a complex ecosystem' (Rudd, 2008) the true definition of transformation in this context would be developed and defined as the BSF programme matured. As Potter wrote, '*The world…..is constructed in one way or another as people talk it, write it and argue it'* (1996, p.98). Having opted to explore the explicit aim of BSF to transform with ICT as a major change agent I found myself beginning this work with the concept of transformation:

- not being clearly defined, at least in an educational context

- when defined, that definition being very context specific

- never explored in detail or as an outcome

- not differentiated from the rhetoric of change

Consequently, with no consensus about what exactly was expected, the next chapter opens with a more detailed exploration of the literature relating to transformation, ICT and teaching and learning.

2   Chapter 2: Literature Review

The literature supporting and influencing this work falls into five broad categories:

Although there is some overlap (particularly with the area of policy making), it is these concepts that have influenced the design of this study. As is to be expected, the bulk of this section relates to ICT and how this might lead to transformation of teaching and learning. As BSF was a Central Government policy it is important to explore its evolution in the context of the political backdrop. Another major influence within BSF was the involvement of the private sector and so it is necessary to explore this factor. It is, I believe important to include current thinking on how learning takes place if it is to be transformed and in what way. My earlier work and the new evidence gathered here indicated the primary importance of how much the teaching workforce had the capacity to embrace change. Consequently the evidence of how effective the CPD (Continuing Professional Development) relating to the use of ICT has been and how BSF responded to this is significant.

2.1   Transformation, ICT and Teaching and Learning

The new electronic information communication technologies emerging at the end of the 20th Century were about to change our lives dramatically, possibly more so than anyone could have imagined (Edwards, 2012, p.2). By the end of the first decade of the new century, cheap and powerful processing power and its associated electronic devices had become part of everyday life. Ofcom (2011) report we became 'A Nation Addicted to Smartphones' and a whole host of other digital technology (p340). Similar conclusions are to be found by the International Telecommunication Union (ITU); they note that internet use grew to be the norm

rather than the exception in daily life (Figure 2). By 2011 25% of the population of the UK accessed broadband solely from a device other than a desktop or laptop computer (2011).
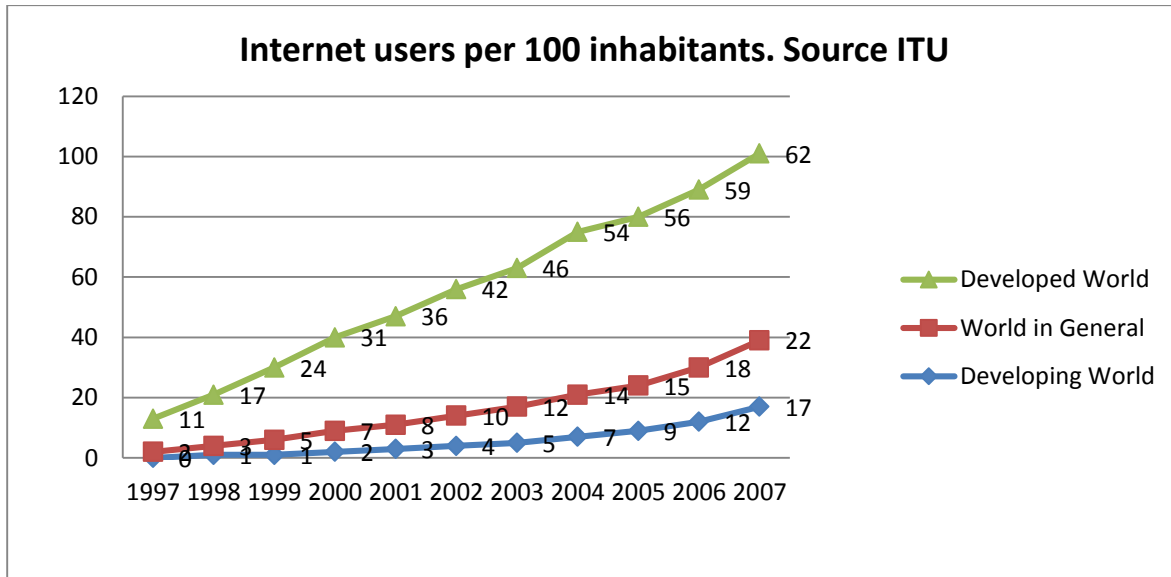
Figure 2: ITU Report on Telecommunication

Common activities (including learning) and objects acquired 'e' or 'i' as a prefix, common functions (even reality) could be 'virtual', business was all '.com' and people and places became '@' if they wanted to be anywhere. Moore's Law[3] (Intel, 2011), is readily used by the popular press (Strickland, 2015) to illustrate how much more computer technology can offer in 'bangs for bucks' terms resulting in computers, infrastructure, and devices making technology more an everyday feature of the lives of individuals in every aspect of what they do. Amazon, iTunes, On-line Banking, Smart Phones, Google, Skype, eBooks, Twitter, Facebook and 'The Cloud' are just a few innovations that could easily stand up to being described as transformational in their own way. Put them all together and ICT can be credited with changing many facets of society beyond recognition. This draws Bijker to comment that 'Social order in modern society can only be explained by *reference to technology'* (2010, p.72). Consequently, radical change to all human activity, much of it transformational, has been inevitable (Woolgar, 2002) and will continue to be so as we all learn to live in the 'infosphere'; as long as the batteries last (Floridi, 2007).

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[3] Moore's law describes a long-term trend in the history of computing hardware whereby the number of transistors that can be placed inexpensively on an integrated circuit, and with it associated processing power, doubles approximately every two years.

Some of this transformation can be viewed as positive, particularly where it can break down international inequalities, the so called 'Arab Spring' of 2011 and its dramatic (if short lived) effect on international politics were largely orchestrated 'on-line', and not without innocent casualties. No better illustration can be found than that of the social unrest of August 2011. Closer to home, what started as a peaceful protest at the shooting by police of Mark Duggan, escalated into looting and lawlessness on an unprecedented scale in many of England's major cities that lasted for three days. The fact that the police found their normal method of controlling these situations ineffective was put down to the prevalence for gang leaders to use freely available encrypted social networking systems to communicate and organize themselves unlike any previous situation, exposing the lack of law enforcement agencies capacity to deal with the power of new technologies. So sadly, not all of the impact of ICT is welcomed when put to criminal use (Cooper, 2010, p.1). Similarly, the rise of 'globally networked capitalism' (Selwyn, 2013, p.29; Fuchs, 2012) is not always welcomed as illustrated by, for example, the seeming ability for large international organization to avoid taxation (BBC, 2012).

Ganes observes *'It would seem to me that internet-*related technologies have directly altered the patterning of *everyday life'* (2005, p.475) and reflecting on this Selwyn suggests *'the development of digital technology represents a distinctly new and improved set of social arrangements in relation to proceeding pre-digital times'* in what he calls *'digital mediation'* (2010, p.7). He adds education as being one of the most *'significant sites of reconfiguration'* and observes that *'for many people the primary concerns of education as resonating especially closely with those of digital technology (p.8) thus highlighting the potential of the impact technology could have on the structure and organization of education.

2.1.1 Rhetoric or Reality

As a key function of modern society, education has obviously not been able to avoid being caught up in this technological revolution. As Edwards reflects *'Today there are few aspects of teaching and learning that are free from the influence of technology in some form or other'* (2012, p.1).

It is unsurprising therefore that writing about the potential of technology to impact on education policy and practice was identified as soon as the computer technology was available (Singer & Phelps, 1982). From the late 80s onwards devices and prices became sufficiently accessible for schools to begin to invest. As their use increased the expectation of impact grew from being a tool for teaching individual tasks to one of the potential

of the now much talked about transformation of teaching and learning. However, move forward 20 years to 2006 and there is confusion as to exactly what transformation brought about by ICT in a teaching and learning context would look like, with the rhetoric being more embedded in the literature than was the reality within the classroom. At the time BSF was being established, observations from two authors only serve to underline the over use of transformation rhetoric;

> '*The word 'transformation' is frequently used in connection with modern educational change, particularly when such change involves new technologies and education for the 'infor*mation society'. However, closer examination reveals that transformation as a descriptor of change is used in ways which are at best multifarious, are often unclear and inconsistent, and are sometimes unwarranted'. (Fisher, 2006, p.293)

and

> '*Education is on the brink of being transformed through learning technologies; however, it has been on that brink for some decades now'. (Laurillard, 2008)

Despite this uncertainty, transformation features heavily in all the Government output associated with BSF (Partnerships for Schools, 2008). Two quangos, British Educational Communications and Technology Agency (BECTA) and Partnerships for Schools (PfS), are (or were as they were both dissolved in 2011) the main conduits for policy delivery and monitoring of the ICT element of BSF. Over time I believe, the use of the term 'transformation' has simply become part of policy rhetoric that only serves to underline the ambiguity of its meaning. This view is supported by Hargreaves when he write;

> '*Transformation has recently become the language of educational policymakers in England and other places. They seem very comfortable with the term though I am not sure they know what they are talking about. When virtually every development is allegedly transformative, it is vital to ask what the term really means. For transformation has to mean more than just continuing improvement if it is to be more than a rhetorical device for selling the latest educational initiative. Transformation implies a profound or fundamental change, a metamorphosis that involves some radical innovation, not just incremental innovation. The difference is important'. (2003)

No matter how often some reports (Becta, 2006; Conde, 2009; Crook et al., 2010) extolled the virtue of ICT as the magic bullet that could revolutionize years of traditional pedagogy they have difficulty, in gathering reliable data, in fact Buckingham suggest it is easier to see negative outcomes;

> '*Such predictions about the transformative potential of technology have a very long history, not just* in education; and in retrospect, it is easy to see how they ha*ve largely failed to come true'.* (Buckingham, 2005, p.1)

In looking for evidence of the anticipated impact of computers in education, the title and conclusions of Larry Cuban's study '*Oversold and Underused: Computers in the Classroom'* offer a skeptical view (2003). Higgins

records the impact of ICT only *'producing relatively small improvement'* while other strategic changes, such as peer tutoring and reciprocal teaching he suggests have '*greater than average impact'* (2003, p.5). Unsurprisingly then the gap between hopes and reality of ICT impact have been described as 'optimistic-rhetoric' (Reynolds et al., 2003) with a sense of lack of impact despite investment (Somekh, 2004). Time and time again authors warn policy makers of the dangers inherent in the simplistic assumption that spending on equipment will equate to change (McCormick & Scrimshaw, 2001).

So, a significant amount of the research evidence around the use of ICT reports conflict between reality and rhetoric, Gleaves refers to this as a *'stark contrast'* (2001). When Williams noted, *'The value of ICT in teaching and learning has been a subject of contention for some time'* (2000, p.307), he encapsulated the contradictions in the published evidence to that point. His own research asked questions of ICT use that would sound naive today. Indeed the quality and reliability of research into ICT and education had come constantly into question (Cox & Marshall, 2007). The United Kingdom Research Assessment Exercise of 2001 (RAE, 2001) had, as reported by Underwood in a review of 2004, highlighted *'some concerns about the qual*ity of *research into the educational use of information communication technology'* (Underwood, 2004, p.135).

Barriers to the successful use of ICT are often identified and are explored in a significant proportion of the literature, although much of it focuses at teacher level rather than the systemic (Bingimlas, 2009). Indeed a BECTA review of the research into these perceived barriers (Jones, 2004) only comes out with perceived blocks at two levels; teacher and school. It fails to acknowledge anything structural to do with, for example, the curriculum or assessment methodology. This I think illustrates a problem with the reliance of policy makers on large scale generalised studies that miss the detail that can be provided by individual research project that gather context specific evidence, evidence that may have some answers, lost in the aggregation or generalisation of 'summaries'.

2.1.2   Links with Attainment Outcomes

A thread does begin to develop in matching ICT rich schools with improving attainment outcomes. The

collecting and analysis of such data (such as GCSE point score) is well established and readily available from

schools' RaiseOnline (Reporting and Analysis for Improvement through School Self-Evaluation) document.

Having invested £34m between 2002 and 2006 on the ICT Test Bed Project, the final report (Somekh et al.,

2007) reports many positive findings. Significantly, the first 'key finding', *'as technology was embedded,*

schools' national test outcomes improved beyond expectations' links success to established examination

measures; interestingly they note this is truer of the primary than secondary sector. Their final observation on

teaching and learning: 'Some changes to teaching and learning strategies were inhibited by tensions between

the priorities of different government policies and agencies with regard to ICT' (2007, p.5) is particularly

significant and will be discussed further in section 2.2 below.

The BECTA review of 2005 included signs of doubt about impact on attainment;

> *'There is a growing body of evidence relating to the posit*ive impact of ICT on learner attainment and
> other outcomes, but we need to develop further our understanding of effective ICT pedagogies and
> *how they can be supported'*,

and alludes to what might be the real issue,

> *'There is evidence that high*-quality educational (ICT) content enables the realisation of learner
> attainment gains, but only if accompanied by pedagogically informed practice. (Hunt et al., 2005,
> p.4)

However, trying to closely tie the use of technology to improved measurable outcomes is rarely attempted, at

least when supported by real data. The BECTA review cites 49 references, almost all of which come from

themselves; work, as Convery brings to our attention, they or other government agencies have commissioned,

> *'For example, the UK government has invested heavily in ICT and has established a partner to*
> promote the use of technology in education. BECTA tend to commission research that is conducted by
> those who enjoy a fundamental familiarity with the ICT world, and whose prior technology research
> *has been shown to meet their needs'* (2009, p.39)

thus supporting my observations that the quality of the research used to report on the impact of ICT is far from robust, reliable or even valid.

2.1.3 Where is the evidence?

If BSF was to use ICT as a primary tool in its quest for transformation, one key question would be how much notice was to be taken of the research evidence, a point discussed by Sutherland who also makes reference to other key issue addressed in this work; the lack of evidence based policy making (see 2.3) and the nature of learning (see 2.4).

> *'Research has not systematically been drawn upon by policy maker*s when developing curricula and guidelines for teachers on how to use ICT in the classroom. There is a tendency to think that ICT is so *'new' that its use will be accompanied by 'new' pedagogies that will somehow transform teaching* and learning. This utopian vision often leads policy makers and practitioners to ignore general theoretical perspectives about teaching and learning, which in our view are central to all learning, *with or without ICT'.* (Sutherland, Armstrong, et al., 2004, p.413)

Wider reading shows that the views in the literature are split as to whether ICT is or is not the transformational tool it had been expected to be, despite the seemingly obvious assumption that it must (Reynolds et al., 2003). Warnings were also sounded about the risks in assuming that ICT would make a difference simply because it was new, there and in use in some shape or form (Okan, 2003; National Audit Office, 2009). A considerable amount of the evidence for the (successful) use of ICT in teaching and learning comes from relatively small scale finite projects such as PELRS (2004; 2006), often carried out by enthusiastic innovators (Cogill, 2003). Transformation is a theme that is explored as an outcome but limitations on its success are clear, referring to a need for more fundamental changes than simple investment can offer.

> *'Nevertheless, PELRS work has also shown that transformative learning requires a more* fundamental transformation of the structures of schooling than is possible by means of innovative work by teachers and pupils onl*y'* (Pearson & Somekh, 2006, p.537).

The 'structure of schooling' is a key issue in this work and will feature heavily in both its observations and findings.

Sutherland et al (2004) looked to investigate the dissemination of good practice in the use of ICT as a teaching and learning tool, particularly in English and mathematics. 'Transforming teaching' while explicit in the titles

of some of the resulting publications (Sutherland, 2004), is hardly mentioned in the text, and then only with the caveat of 'somehow', or as part of 'complex' systems at best (2004, p.413) with ICT as an enabler;

> 'Humans are expert at creating tools to transform practices and knowledge. ICTs are part of this creative production. Knowing how to use these tools to transform learning in schools is not so straightforward' (p.424).

Even when successes are recorded, clashes with government imposed 'National Strategies' and the lack of real evidence of the contribution ICT was making were also part of the findings. In particular the all-important 'context' was found to be the key (Triggs, 2004).

Two publications from the eastern hemisphere illustrate the search for understanding of the growing potential of ICT was not confined to the UK. A comprehensive review, undertaken in Australia, of the international evidence (Newhouse, 2002) warns of the need to understand the complex (and unproven) link between improved learning and ICT, while in Hong Kong, although seeing positive signs to justify recent investment and reform, Lee still asks questions similar to his western counterparts (2010).

So, the lack of independent, peer assessed research is, in my view, stark. When the look for quantifiable outcomes of the impact ICT has on teaching and learning was given serious thought, respected researchers found flaws in the reliability of the data (Harrison et al., 2004), indeed the very nature of research design and the conflict between types of data was also brought into question (Gardner & Galanouli, 2004). The 'optimistic-rhetoric' is again cited by Nichol as it finds its way to becoming fact through 'flawed research' (Nichol & Watson, 2003).

.One inherent problem in the literature is, I believe, that the small studies report on what is often detailed classroom practice that can get to the heart of teaching and learning, an insight lost in the large summative papers; yet it is the latter that seems to gain most attention, particularly at strategy level.

2.1.4   Issues of Pedagogy and Structure

Even before the new millennium began, Seymour Papert, a respected American commentator on new technology in education argued that transformation (he uses the term diversity) will only be possible if 'we break away from the idea that the computer is there to serve an already antiquat*ed curriculum'* (1999, p.1) indicating that the clash between the agendas of accountability and transformation was being well documented

on both sides of the Atlantic at an early stage. While new technologies were developing at a pace that were transforming many aspects of life, the reluctance to set schools free from compliance to performance indicators with increasing state control, was if anything causing pedagogy to retrench (Williams, 2005). School leaders will be reluctant to make a change in pedagogy on a large scale if quantifiable outcomes are perceived to be threatened. Coupled to that is the embedded school organisation and pedagogy of almost Victorian design (Gillen et al., 2007).

So no matter how much central government heralded their reforms as transformational (Office of Public Service Reform, 2002), the irony is that the associated target and accountability systems may have reduced the potential for success (Wallace, 2008). This is not a new observation as even before the technology explosion of the 21st Century the potential impact of ICT in schools was seen as needing to be part of a bigger educational picture. As early as 1995, it was pointed out that ICT was no 'silver bullet' but needed to be part of a 'coherent school wide agenda' (Means et al., 1995, p.69). Government commissioned research noted when and how ICT was (and was not) motivational (Passey et al., 2004) and argued the need for proper integration into learning processes. For new technologies to make a difference they need to be employed where student, teacher, school, leadership and pedagogy all work together to facilitate change (McCormick & Scrimshaw, 2001; García-Valcarcel, 2010), and be designed to support learning; such convergent scenarios are hard to find, particularly in the secondary sector.

Although I have painted quite a sceptical picture so far, there are many examples of positive effects of ICT to be found in research literature. In their review of pedagogy related to ICT, Webb and Cox (2004) report the most success in ICT enabling a (positive) change in teachers' practice was when they allow learning to be pupil centred, where the learners' independence is facilitated. Bottino makes even grander claims when he says *'ICT tools can influence and transform learning by fundamentally changing the way in which a content can be taught and learnt'*(2004, p.566) and is supported by Sutherland in his observation that ICT can provide the creative tools to 'transform practices and knowledge' (2004).

2.1.5 Comparable Projects

In looking for an example of a central government initiative comparable with BSF, the story of the introduction of Interactive White Boards (IWBs) into British classrooms does, I believe, serve the purpose. The literature published as a result shows how it mirrors all of the tensions explored in this work. Late in 2002 Charles Clarke, the newly appointed Secretary of State for Education (he moved to be Home Secretary in November 2004) stated 'Every school of the future will have an interactive whiteboard in every classroom, technology has already revolutionised l*earning'* (Arnott, 2004). Perhaps he failed to notice that much of the evidence for this claim was not peer-reviewed and 'often sponsored by the manufacturer of the equipment' (Higgins et al., 2007, p.218). This initiated a national pilot to install IWBs into 200 classrooms in 80 primary schools in 6 local authorities in England; their use was to be targeted at the National Literacy and Numeracy Strategy. If the stated aim of the National Strategies was to raise attainment in English and mathematics, then by default the success (or failure) of the IWB initiative would be judged by its impact on KS2 test results. The potential for evaluative studies was huge and the literature output reflected this. A Europe wide summary on the impact of ICT in schools was carried out in 2006, with a 'predominance of UK research ' (Balanskat et al., 2006, p.55) that observed; 'In terms of evidence of ICT impact UK stud*ies provide the richest picture'* (2006, p.18); studies into IWB use dominate. Among the work reviewed is a summary of the impact of the IWB initiative in which Higgins notes that *'short and medium term indicators were positive'* (in Thomas & Schmid, 2010, p.97) although he finds only scant evidence of improvement in attainment, none of which is maintained over time. Remarkably, in the European review this is translated as *'overall the evidence base* (actual and perceived) shows ICT has a positive impact on attainment levels *and subject related performance'* (2006, p.56). Perhaps the key word is 'perceived' as much of the evidence reports positivity from both teachers and learners about their engagement with the new technology (Thomas & Schmid, 2010b, p.97; Gillen et al., 2007) . That is not to say ICT could not have an impact on those basic outcomes, following the publication of the ImpaCT2 study (Somekh et al., 2002) Harrison et al did produce empirical evidence of a positive correlation between ICT use and attainment;

> *'It has to be acknowledged that the overall level of usage of ICT was lower than some analysts may* have wished to be the case, but it is nevertheless clear that statistically significant findings were found

positively associating higher levels of ICT and school achievement at each KS, and in English, Maths, *Science, Modern Foreign Languages and Design Technology'*. (2004, p.336)

Indeed, Hartley points out that the literature almost exclusively reports success stories with the use of ICT (2007, p.56), but does find a collection of less positive papers in The British Journal of Educational Technology, Vol. 36 issue 4 from July 2005.

As mentioned above, most of the evidence comes from small scale projects and at the micro level. When research looked at individual classrooms, it became obvious that the technology was not the key issue. Goodison compared two classes (and therefore teachers) with identical technology, in the same school and was able to describe how IWB use both supported and hindered learning (2003) depending largely upon the teacher by whose hands it was deployed, thus indicating context is all. In the Futurelab report on IWB use Rudd (2007, p.11) comes to similar conclusions and cites a report on the London Challenge IWB initiative (Moss et al., 2007) that suggest *'the teaching profession should engage in a broader discussion as to the way in which IWBs can be used to extend and transform existing practice'.* Helpfully, in the same document Rudd does offer a definition of transformation:

> *'…*which is *where the technology is used to 'add value' to the whole learning process. Teachers use* and create a range of other resources that enhance the learning process through a more enquiry-based approach, with learners becoming centrally involved in its use and where they actively *construct knowledge through interaction.'* (2007, p.5)

This contrast with observations (I offer three here) on the use IWBs that turn them into nothing more than what I have referred to as 'Pay Attention Technology'.

> *'In fact some would claim that pupils' active involvement with the board during whole*-class teaching reduces the pace of the lesson and can cause boredom*'.* (Smith et al., 2005, p.95)
>
> *'*Learners are expected to sit still and to be captivated by lessons that involve very little of their proficient language*'.* (Brand, 2010, p.114)
>
> *'…*they can also reinforce traditional approaches to learning and teaching *'.* (Edwards, 2012, p.93)

Interactive White Boards were one of, if not the technology around which classrooms (or learning spaces) were designed and constructed. Given that the schools involved in BSF already had IWBs installed in most classrooms in their old building this supports my observation that BSF was simply 'updating the present' and asks the question of how much thought was given to the 'F' in BSF.

2.1.6   Was the Technology Provided by BSF Right?

The root of the above observation lies in the fact that Interactive White Boards along with other 'educational technologies' (e.g. PowerePoint) (Selwyn, 2013, p.6) have their developmental origins far from the classroom; they have been imported and are no more than 'pretend', 'fabricated' and 'inauthentic' manifestations of applications and devices first seen in the world of business and commerce (Bigum & Rowan, 2008, p.249). As such these technologies ignore the positive and empathetic relationships between teacher and pupil where good channels of communication (Schmid, 2006, p.60) are crucial for effective learning and ignore simple issues important in learning such as face to face contact (Cooper, 2010) and the principles of constructivism (see 2.4 below). Bijker's observation that perhaps we spend too long *'exploring how technology is made and used rather than what it essentially is'* (2010, p.74) is very relevant here and leads to the development of the concept of the 'Social Construction of Technology' in which technology and it use *'develops through an organic or evolutionary process rather than the result of a linear mindset'* (Edwards, 2012, p.10), so rather than schools be provided with existing technologies installed to set plans (for example, IWB's were installed at the front of all classrooms, 1.2m from the floor) they should be given time to shape and customise their own environments, although when looking for successful outcomes of this evolution in an educational context Sutherland et al warn of the inherent complexities.

> 'Humans are expert at creating tools to transform practices and knowledge. ICTs are part of creative production. Knowing how to use these tools to transform learning in schools is not so *straightforward'.* (2004, p.424)

One author was to point out that the use of ICT in schools had failed to 'achieve lift off' largely due, it was felt, because of the reluctance to embrace change (Watson, 2006) and also accept the complexity of what educational technology really is, for as Selwyn noted;

> 'It is not a single, homogenous entity. Instead, *'educational technology' is deceptively neat shorthand* for a diverse array of socio-technical devices, activities and practices. (2013, p.6)

He also joins those who lament a *'paucity of critique'* (p.11) in academic study

2.1.7   Change

The literature on ' barriers' referred to above cite 'resistance to change' in their list (Mayya, 2007, p.11)

(Becta, 2003), and often lay this inertia at the feet of teachers. However, throughout his work on educational

change Fullan takes a much more systemic view when refering to 'drivers', both positive and negative. This is

his list of 'wrong drivers':

> 1. Accountability: using test results, and teacher appraisal, to reward or punish teachers and schools
> vs capacity building;
>
> 2. Individual teacher and leadership quality: promoting individual vs group solutions;
>
> 3. Technology: investing in and assuming that the digital world will carry the day vs instruction; and
>
> 4. Fragmented strategies vs integrated or systemic strategies.
>
> (Fullan, 2011, p.1)

BSF could well be a study in bringing all these 'wrong drivers' together thus limiting the potential of change

and if that was the case then obviously any chance of change (or transformation) would get off to a difficult

start. Fullan's inclusion of assumption about technology (item 3 in his list above) are worrying and his

observation of 'fragmented strategies' in particular could describe the political landscape as the first BSF

contracts (including the one involved in this study) were being designed. Indeed, Williams adds his support to

this thinking as he points out;

> *'A narrow managerial focus on compliance to performance indicators and the formularization of*
> pedagogy are resulting in a redefining of the professional status of teachers and teacher education,
> and this is happening at a time when the anticipated needs for the citizen of an Information Society
> *will be flexibility, creativity and originality'.* (2005, p.319)

and

> *'There appear many contradic*tions within the DfES between the desire for a new openness and
> *flexibility and a reluctance to let go of existing constraints on the curriculum and practices of school'.*
> (2005, p.335)

At the start of new millennium, Clouse and Nelson (2000) cite decades of the quest for school improvement

being wasted on tinkering with an instructional delivery model that has ignored improved understanding of

how learning takes place. They encourage those intent on education reform in American public schools (their

state sector) to embrace 'constructed learning' (See 2.4) in their planning as they try to integrate ICT. The

potential of ICT to change the organization and methodology of teaching, in linking 'new technology' with 'new pedagogy' (Sutherland, Armstrong, et al., 2004) and observations that technology can be used to learn 'with' not 'from' (Jonassen et al., 1998; Howland et al., 2013) point to transformative potential.

This review begins to identify conflicts in the published literature and the aspirations of BSF. Little or no detailed reference was made during the planning and roll out of BSF as to exactly how the planned new environments and the technology within them were to impact upon teaching and learning let alone transform it; there seemed to become an accepted wisdom that transformation would occur because schools would be physically different, modern and technology rich, and of course huge amounts of money would had been spent (National Audit Office, 2009). The next section attempts to explore one of those tensions; that arising from different areas of government policy making.

2.2   Government Policy and Review

Education in the UK has become highly politicized; from my own perspective this trend began in 1971 when Ted Heath's education secretary, one Margaret Thatcher, used the *'Education (Milk Act) 1971'* to abolish free school milk. As a fresher involved in the protests I, like most others were unaware of what was to come. Until Thatcher progressed to becoming Prime Minister in 1979 the post of Education Secretary had not been perceived as a cabinet post of significance or a platform for higher office. Her tenure in 10 Downing Street changed that landscape forever. Not only was the profile of education policy elevated, her administrations heavily politicized the statutory requirements that were to be imposed on schools.; the National Curriculum, Local Management of Schools and Ofsted are just three examples (Gillard, 2011). Following Thatcher, a succession of premierships from Major to Blair, Brown and Cameron (entering his second tenure from May 2015) have seen 16 different and high profile Secretaries of State for Education, each trying to make their own mark in some shape or form. Through legislation impacting on everything from training days, funding, curriculum, examinations, accountability and the designation of individual schools in relation to their Local Education Authority the trend has been to continue using education policy (and therefore schools) as a vehicle to embed political ideology (Pearson, 2011; Henderson, 2013; Merrick & Rentoul, 2014).

2.2.1   Education, Education, Education

In a perceived need to rebuild or refurbish all of the 3500 secondary schools in England by 2023, the Labour government launched BSF in 2004 with a potential budget of £55bn (Mahony & Hextall, 2013, p.845). The departing Conservative government of 1997 had invested little in schools (Hills et al., 2009, p.2) and there was no legacy of an IT (without the C at this point) strategy for education (Wild & King, 1999). The Stevenson report of 1997 was held up to prove 'the state of ICT in our schools is primitive and not improving' (Stevenson, 1997, p.4) and insisted this situation be rectified as a matter of national priority. On election, New Labour set about embracing the rapidly emerging concepts of the 'information superhighway' and the internet in a large proportion of their thinking and policy making. The use of technology was a thread running through public sector reform in areas ranging from health, legal, welfare and government (both local and national) services. Education was at the forefront of a 'social justice agenda' (Mahony & Hextall, 2013, p.857), the approaching new millennium provided a milestone to hang policy making around; in fact it was in the formulation of Labour Party policy prior to the 1997 election that they put the 'Communication' in 'Information Communication Technology'; ICT was born.

 Consequently the era of New Labour, with its mantra of 'Education, Education, Education' heralded in 10 years with schools and all those in them placed at the forefront of government policy, under the scrutiny of any group or individual who felt the need to offer an opinion. The spending of £5 billion on the country's schools ICT infrastructure alone underlines the importance that was placed on 'educational technology', although it is worth pointing out, as Selwyn does, that this is '*not a single homogenous entity'* but *'deceptively* neat shorthand for a diverse array of socio-*technical devices, activities and practices'* (2013, p.6).

The scope for innovation was potentially huge. As the 21st Century opened, business was preoccupied with launching into cyberspace and embracing the 'dotcom' boom so it is easy I think, to understand the pressures that lead to an explosive evolution in education technology. National Grid for Learning (NGFL), New Opportunities Fund Training (NoF), e-Learning and other strategies became part of the educational landscape. The scale of the government agenda was ambitious and expensive (Laurillard, 2008).

Despite many of these strategies being saddled with targets to justify the taxpayer and lottery players' investment, the evidence of real impact was, for some, proving hard to find. The concept of 'spin' fuelled the

fire of the sceptics who looked for the gaps between policies and effect (Gewirtz et al., 2004) and concluded that actual change was difficult to quantify. Specific research on key aspects of ICT impact such as e-learning, (Pittard, 2004) were more positive but still not uniformly so, leading me to further discuss the research evidence on which policy could have been in the next section.

2.2.2 Evidence of Evidence Based Policy Making

> *'There is nothing a government hates more than to be* well-informed; for it makes the process of *arriving at decisions much more complicated and difficult.'* (John Maynard Keynes 1936)

The Government had indicated its willingness to increase the use of research to inform the drafting of legislation (Davies, 2004), through an Evidence Based Policy (EBP) making approach (Cabinet Office Strategic Policy Making Team, 1999), the only question was the nature and reliability of the evidence base to be used (Davies, 2004). Healthcare may have been one area where EBP was proving effective (Cookson, 2005), but a similar situation was far from clear in education contexts, where even the merits of different types of research methodology were contested (Davies et al., 2000). Indeed, the framing of the questions alone in education research can be seen to influence the conclusion of '*what works'* and is highly *'context dependent'* (Nutley et al., 2003, p.3). More recently Wallace observed *'Unsurprisingly, government* politicians marginalize theoretical knowledge' and in the same paper, 'complex educational change is contextually dependent*'* (2003, p.9).

From the early day of the National Grid for Learning (Selwyn & Fitz, 2001) to more later assessments (Selwyn, 2008;Younie, 2006), there is a considerable amount of evidence that government initiatives around ICT and education have a mixed track record. Although this is far from a recent perception and is neither new or confined to technology, *'There is a growing concern that almost 20 years after the 1988 Education Act,* top-*down, large scale reform has stalled'* (Barker, 2008, p.669).

As if to underline the legislative imperative to embrace ICT use in education and expose the lack of a unifying strategy in the UK, the Scottish Executive (headed by the First Minister of Scotland Henry McLeish),

commissioned a task force to recommend actions so that Scotland could embrace the 'Knowledge Economy'

(Scottish Executive, 2001). A core outcome was to ensure a 'pervasiveness' of embedded ICT where;

> *'..accessing and using new technologies is as familiar and comfortable to students, and their teachers and lectures, as the use of blackboards/whiteboards and books'* (p19).

Reviews of the successes and failures of ICT projects offer conclusions that this chapter suggests were mostly

ignored by BSF, for example;

> *'It is clear that introducing a new technology into any learning situation in any country requires a great deal of thought and planning, and a good deal of development testing'.* (Hartley, 2007, p.56)

If this is a valid observation, then surely BSF was missing major steps in both its planning and

implementation and far from evidence based. Indeed the Government's own regulator, OFSTED, was

providing evidence that spending alone was not enough. Their assessment of 5 years' worth of investment

reported an improved use of ICT that was patchy at best and 'improving slowly'. They list a range of

'barriers' associated with embedded pedagogy, teacher skill sets and the need for even more investment

(OFSTED, 2004, p.55). One year later in a Becta commissioned reflective summary, their usual upbeat tone

was tempered by an observation of the need for a 'unified strategy *for ICT in Education'* because there was, as

yet *'no definitive road map for ensuring technology implementation will deliver desired change'* (Hunt et al.,

2005, p.43). By the end of the decade Yang is still unable to find clear evidence of transformation (2012,

p.103). BSF began with an almost myopic positivity and the top down delivery model (vision statements

excluded) that ignored research evidence and excluded input from those expected to deliver (i.e. teachers)

leaving stakeholders disenfranchised, or as Shackel observed, *'*rarely do the frustrations of end users get aired

anywhere but the staffroom*'* (2004), and of course it is in the classroom where all the policy initiatives

emanating from central government are ultimately felt and delivered.

2.2.3   Policy Stream Conflict

Throughout this work is the recurring theme of the clash between the need to improve standards that are

measured as GCSE outcomes published in league tables, and the wish of BSF to be innovative and

transformational. The OECD had pointed this out when stating;

> *'schools are under increasing pressure to conform to* precise, standardised outcomes, while to be an innovative learning organisation means being able to experiment and take risks, with the necessary *corollary of occasional failures'* (2001, p.105).

There is also the potentially cynical view of the futility and superficiality of governments trying to reform schools while entrenched pedagogy and structures remain. Cuban uses a maritime metaphor as an illustration.

> *"The surface is agitated and turbulent, while the ocean floor is* calm and serene (if a bit murky). Policy churns dramatically, creating the appearance of major changes... while deep below the surface, life goes *on largely uninterrupted"* (Cuban, 1993, p.2).

Almost no government policy, BSF included, has a significant impact on school organization; in particular the two key areas of assessment methodology and resulting school accountability measures published via league tables. If anything, recent legislation has further entrenched both. The resulting tension between innovation and accountability agendas was not lost on some in parliament.

> The complexity of the school accountability and improvement system in England is creating a barrier to genuine school improvement based on the needs of individual schools and their pupils (Children Schools and Families Committee, 2010, p.98)

International comparisons also pointed out that the UK's testing regime may be a barrier to school improvement. The 2011 OECD Economic Survey (2011) reports on 'Reforming Education' (pages 85-97) and comments that increased spending on schools has produced only limited improvement in outcome and cites *'the extensive focus on grades'* as a *'cause for concern'*. These two observations are explicitly linked in the text and recommendations suggest re-assessing the focus on examination if we are to reverse the UK's slide down the Programme for International Student Assessment (PISA) scale. Observations on the negative impact of testing on the breadth of the curriculum are not new but that has not stopped the relentless rise in the importance of examination result to judge pupils and schools (Mansell, 2007).

Schools dealing with the BSF transformation agenda were still left to fit in with the expectations of the Ofsted school inspection framework and summative performance judgements published in RaiseOnline (and the response of every national and local newspaper). With accountability measures too politically sensitive to reform, BSF funded schools were potentially in a situation that would inhibit chances of transformation in a number of ways. This is what Wallace calls 'policy pathos' and is caused by the distance policy makers find themselves from the contexts in which they expect legislation to have an impact (2008, p.7). Legislators it would appear, rarely take account of what happens to their *'seemingly common'* reforms as they are

'refracted' through the *'micro-climates of schools'* (Goodson, 2001, p.49). It was Head Teachers who would be at the focal point of that refraction, as Moore et al put it, they were again to 'negotiate, accommodate, resist, and mediate mandated policy and the impact that such responses may have on pre-existing educational values *and vision'* (2002, p.176).

This 'new orthodoxy' of central governments *'top-down reform'* in education (Hargreaves et al., 2001, p.1) on schools has generally been noted as having redefined the work and lives of teachers and school leaders in both intended and unintended ways, that suggests *'for every policy initiative there will be unpredicted and unpredictable results'* (Fink, 2003, p.105). With something on the scale and ambition of BSF with a distinct top-down approach, there was the potential for outcomes and pressures other than transformation, some that at the time had not been thought of; for example, future technologies, the rate of technological advance and simple refresh of devices. The logic was that the use of the private sector and MSPs would shift concerns around these issues away from schools; the reality was somewhat different.

2.2.4 Going Private

The enforced use of the private sector that permeated BSF was a significant new facet for schools to face. Local Education Partnerships (LEPs) with their 3 partners of LA, builders and ICT providers were the strategic management of BSF projects. Schools, having become increasingly autonomous (particularly financially) now found themselves thrust into the world of contract negotiation and market forces, a situation that had its gestation under the previous administration but was now being embraced by the current one. In order to overcome the perceived inertia suppressing the rate of change, the private sector was seen as the potential catalyst. As Tony Blair put it in his 1998 address to local government: *'If you are unwilling or unable to work to the modern agenda, the government will have to look to other partners to take on your role'* (1998). As a result, the pressure to outsource the ICT component of BSF was accepted and embraced. However, it appeared that the Government failed to link evidence of the relative success (or failure) of outsourced ICT projects from departments other than education as it embarked on BSF, according to Butler the problems were deep rooted and systemic.

> *'There is a major software engineering challenge to deal with the inexorable rise in capability of* computing and communications technologies*'*

and

> *'Britain is failing to produce software engineers and managers with the IT and project management* skills to commission *and execute complex IT projects'* (2004, p.1).

Consequently, by the end of the decade the UK government had become a *'world leader in ineffective IT schemes'* (Margettes, 2011).

In a parallel example from the NHS, an £11 billion ICT patient records system (called Lorenzo) expected to create a patient database by 2015 was, in 2011, deemed destined to fail and in 'disarray' after the first £2.7 billion has been spent (Guardian UK, 2011). Development pressed on and a further £7bn was spent until the end of 2013 when the project was scrapped. A principle expectation of the NHS solution was only to make patient records available, any transformation of health care was expected to be delivered in surgeries and operating theatres by health professionals. With spending on ICT within BSF constituting a project of similar proportions to any of those in other public sector areas, PfS insisted that BSF partners go to the market (on an fragmented LEA by LEA basis) to seek an ICT solution that would not only deliver the infrastructure required but also the strategies and design that would lead to the transformation of teaching and learning and in doing so putting the control of a main tool of pedagogical change in the hands of commercial companies.

Central government itself was challenged directly by at least two review bodies on the outcomes of BSF. They support the Head Teachers' views on two fronts; those of the process itself and its success in an educational context.

> *'It is too early to conclude whether BSF will achieve its educational objectives. To date, over-*optimism has meant the programme could not live up to expect*ations'.* (Public Accounts Committee, 2009)

> *'The Department and PfS were overly optimistic in their assumptions of how quickly the first schools* could be delivered, leading to unrealistic expectation*s'.* (National Audit Office, 2009, p.6)

With observation such as these the need to investigate the impact of BSF was initiated.

For me one obvious result of engaging the private sector was that BSF designs became politicised in that, at considerable cost, their 'kerb appeal' became crucial in reinforcing the concept that what was taking place inside, by association, had to be as radical and modern (Selwyn & Facer, 2013, p.10) underlining the 'power of artefacts (Matthewman, 2011, p. 5). Imposing entrances and receptions, curved glass walls and atria

abounded, not one of which had an impact on the schools core business. 'Quick Wins' were as much about spin as they were about children.

2.2.5 A Rush to Show Impact

It is not difficult to see why the whole BSF process, other than its building programme, might have had little measurable impact on the majority of stakeholders if, as Mahoney and Hexall point out;

> *'The purpose/objectives of BSF were unclear'.* (2013, p.854)

Although this work gathered data as the first BSF schools were opening there was already evidence of failures and problems with heating, lighting and ventilation along with design errors beginning to emerge. Woolner reflects on similar examples from recent history.

> *'The history of school building programmes warns us tha*t the interactive whiteboard and the atrium could be the typing suites and flat roofs of the middle decades of the 21st *Century'.* (2007, p.63)

 When these early criticisms of the misdirected focus of BSF were being recorded. Rudd offers this view:

> *'*The BSF programme has received criticism because the relationship between the quality and design of infrastructure has not been adequately linked to the wider issues around the quality and approach to learning and teaching that will occur*'.* (2008, p.5)

He also observes that even the physical results of BSF may be not be as transformational as they first appear.

> *'*It is easy to forget when we are talking about new buildings, new materials, new technologies and so forth, that the future can be, and often is, just an updated version of the present, where nothing *changes significantly. The 'gloss of the new' is equated unproblematically* as innovative or transformative but usually is little more than a means of increasing the efficiency of existing systems and processes or new ways of doing the same thing. There is a real danger that many of the projects arising from BSF will suffer this *fate'.* (2008, p.7)

The observation that increased efficiency may be misinterpreted as transformation is an issue that I will reflect on in Chapter 5. However, Rudd does at least see some BSF schools beginning to succeed with the teaching and learning agenda.

> *'*This is encouraging, and visits to local authorities and schools going through the BSF programme reveals they are now recognising the broader educational transformation potential r ather than engaging in merely a building programme *'.* (in Page, 2008, p.9)

So, as BSF began to be put under the political spotlight it is unsurprising that when being questioned by

members of a Parliamentary Select Committee about issues surrounding the demise of BSF, Tim Byles the

outgoing chairman of PfS admitted the claim of transformation had possibly been overstated, as this transcript

illustrates (Parliamentary Select Committee, 2010).

> *'*I want to go right back to the inception of the project overall. What did you regard as you and your organisation's mission? Was it about building just schools for the future or changing schooling for the future? Ask Damien (Q5).

> *'Building Schools for the Future is a very ambitious programme to contribute towards what was* defined as educational transformation. It was not to be educational transformation, but to provide environments where bullying is designed out of school design and having spaces that inspire and engage young people alongside teaching and learning, school leadership and encouraging the *involvement of parents.'* Replied Byles.

> *'In retrospect, would you have rather had less emphasis on the p*hrase about transforming education and all the expectations that it inevitably raised in something that was ultimately a capital programme to build new schools? Hinds continues (Q6).

> *'*At the risk of sounding like Sir Humphrey, it is not my job to question that. We are a delivery agency. The Government set the policy for us, and we then deliver it—*whatever the policy may be',* continues Byles. and *'We therefore set about trying to make sure that what is a complex system is delivered as* quickly and effectively as possible when compared with other similar approaches across government. Quite a lot of data show that Building Schools for the Future is best in class at delivering what are *defined as complex procurements'.*

> I realise that you will say that understandably, for some schools, it is early days and too early to measure, but would you say that, for schools that have been part of the BSF programme, education has been transformed as opposed to schools having been transformed? Hinds delves further (Q7).

> *'Yes'.* Concludes Byles, 'We have seen quite a lot of early information. It is right to say that we cannot test it absolutely at this stage. We have seen leaps forward in performance in schools. The (sample school) refurbishment scheme in Sunderland went from 19% to just over 60%, including English and maths, in two years—same school, same teachers, same pupils, but there was a real *impact'.*

This last statement refers to my own school. Mr. Byles has I believe, encapsulated the dilemma that was a key

that helped stimulated this work. It appears to be the case that he believed BSF could take some credit for my

school's rapid improvement in one performance indicator, and by association this was due to transformation

brought about by BSF, even though he was unsure what transformation was expected of BSF when he took his

post. This is, I believe a classic case of a politician *'taking possession of the new technology image and*

offering it to the electorate as a talisman' (Somekh, 2007, p.93). What Byles did not know was the context of

these outcomes; in particular the details of our curriculum and staffing changes, planned and delivered over

the previous three years that were the real agents of improvement and that the BSF upheaval, while two years

of building refurbishment work, was if anything a negative force. Byles' attempt to imply cause and effect without any evidence at a parliamentary committee resulted in a range of unrepeatable responses from my senior colleagues that illustrated their strength of feeling and another example of myopic positivity.

 In fact, the BSF schools surveyed by PWC reported much weaker outcomes than our own and cited the negative pressure going through BSF had exerted on their schools; my own school was the only one to report improvement. Another vehicle of Government accountability, the Public Accounts Committee had previously pointed out that *'the Department (DfES) had not explained what success (of BSF) looks like'* (Public Accounts Committee, 2009, p.5), while almost in their own defense, PfS had stated that BSF was *'a catalyst and enabler for change, but not itself the change'* (quoted in Mahony & Hextall, 2013, p.354).

I have explored the conflict between the wish to transform and the structures of accountability that emerges when the impact of different strands of New Labour government policy and investment are reviewed together, what Whitty refers to as *'a combination of misdirected expenditure and ideological confusion'* (2009, p.274). Some even suggest that, for a socialist party their education policy was 'neo-conservative' (Hill, 2006) and Whitty's observation of; *' the significant continuities between Conservative and New Labour policies in terms* of the drive for an essentially market-*based education system'* (2008, p.165).

Jon Coles, former head of standards at the DoE makes an observation which I think offer a perfect conclusion to this section.

> *'*More recently, successive governments have moved away from that original aim (league tables as *part of the Citizens' Charter)* and used the tables as a policy implementation tool. Sometimes with dramatic *results'.* (Coles, 2015)

In order to deliver BSF on time and budget, government policy to involve the private sector referred to above opens up a need to investigate further the literature relating to the concept of a public service faced with the principles and values of the market place. This will be explored in the next section.

2.3   Marketisation and Commercialisation of Education

In 2013, Selwyn recorded that the global market of selling technology to education was (conservatively) estimated at $5 trillion per annum and rising (2013, p.2), and as such demands 'close scrutiny (Selwyn, 2010, p.70). Schools had always sourced their ICT provision from the private sector; BSF was to take this a step further as full public/private partnerships became the only strategy available for its delivery.

As Mahony et al point out *'BSF is located in the wider policy context of New Public Management (NPM) adopted by governments during the 1980s'* (2011, p.342) in which the public sector draws both principles and investment from private sector. This trend of involving the private sector was well embedded by 2004;

> *'New Labour has pushed marketization and priva*tisation forward at least as zealously as the *conservatives did'* (Marquand, 2004, p.118),

> *'and had gone beyond the provision of services into the realms of strategy; Private sector organisations are increasingly involved in both policy formation and policy implementation'*. (Ball & Youdell, 2008, p.59)

Specifically, Private Finance Initiatives (PFIs) in the building of schools were a manifestation of NPM and had an inevitable influence on BSF and the ICT provision in particular.

Years earlier the Education Reform Act of 1988 was watershed legislation in the delivery of state education in the UK. It introduced, for example, the National Curriculum and Local Financial Management (LFM). It was seen as the event that began opening up, what until then, had been a very state run closed shop, immune from the world of market forces and commerce (Ball, 2008). Schools were to feel the pressure of market forces on two fronts. Firstly, LFM made each school budget an individual cost centre whose income was directly dependant on pupil numbers. Consequently, they had to compete for their intake while the open publication of performance league tables allowed families to 'shop around' for the best school; an explosion in glossy school brochures and marketing open evenings were two highly visible outcomes (Levačić, 1998). Secondly, central and local government funding was reduced and schools were charged with financing their own capital projects

or bidding for resources from limited 'pots' of money. At the same time Public-Private Partnerships (PPPs) (Hodge & Greve, 2009) had become a feature of some large capital projects (The Channel Tunnel for example) and were now being applied to investment in public sector capital projects in the form of PFIs. Consequently, since 1992, PFI projects have been used in school (and prison and hospital) building projects throughout the UK including BSF. Not all BSF projects were PFI in nature but most involved the setting up of Local Education Partnerships (LEPs); effectively 3 way PFI partnerships involving builders, LA and ICT providers (Accounts Committee, 2009, p.10). The Managed Service Provider (MSP) model used by BSF for their ICT programmes was essentially one of outsourcing in which BSF partnerships handed over their ICT systems to private providers to procure, install and maintain; the theory being that schools would benefit from a known fixed cost and ICT being the '5th utility' (Partnerships for Schools, 2011).

This work has obtained data from three sources that can add to this area of debate. One school in the research sample is a previous PFI build with BSF as a 'refresh'. Another school had experience of managing, unilaterally, a full BSF ICT programme before having a MSP imposed upon it. The other had relatively poor ICT infra-structure and BSF was their chance to make major transformational improvements. The summary of this final report will endeavour to comment upon whether or not involving an MSP, working to a business model, helps schools focus on the transformation teaching and learning.

The use of PPPs had started to be problematic after 2007 as the financial crisis began to unfold along with the reluctance of banks to fund programmes such as BSF became clear (National Audit Office, 2010). Also unfolding was evidence of the legacy of debt schools and LAs were being left with as part of PFI and if those involved saw any benefit from the business partnership, what the journalist Watts referred to as 'The Bonfire of the Private Finances' (2011).

On the first weekend of June 2011 both the TES (TES, 2011a) and Sunday Times (2011) published reports on, in the opinion of journalists, the excessive prices charged by IT providers and architects respectively during the first wave of BSF. This editorial theme continued and later that month, the TES was to state *'... it also* highlights wider concerns within education about the increasing role of private companies profiting from *public services'* (TES, 2011b). Following the phone hacking scandal that closed the News of the World in July 2011, writing in the Times Mathew Parris listed the 'Next 20 Scandals' waiting to be disclosed, at number 15 he includes*, "*The public sector is chronically incapable even of understanding, let alone managing, large IT

projects; and private sec*tor contractors are guilty of daylight robbery"* (Parris, 2011). A National Audit Office report was to warn of the spiraling cost of BSF and the inherent flaws in the procurement process, largely caused by the interface between Local Authorities and private partners (National Audit Office, 2009). There was a clash of cultures when the education sector and private sector companies were asked to work to the agenda BSF had set. The danger was that the integration of ICT into schools would be addressed at the superficial level of hardware procurement and installation and as such not recognising that the role of ICT in schools is much more complex than that of a service, reducing it to the same level as heating, lighting and furniture is to underestimate its importance in teaching and learning.

> *'The proliferation of technologies has complicated the teaching-learning process and finding the best* ways of integrating technology into classroom practices is one of the challenges the 21st century teachers face. Effectively integrating ICT into learning systems is much more complicated than providing computers and securing a connection to the Internet*'. (Afshari et al., 2009, p.96)

Fifteen minutes in to his first of 4 Reith Lectures, Sandel reflects that 'Market incentives erode or crowd out *nonmarket incentives'* (2009). Applied to the BSF context this theory could suggest that the pressure on the MSP to deliver a solution within budget and make a profit left little room for the vital teaching and learning discussions to have room to breathe. What is evident is that the lessons learnt were significant enough to be noted in parliamentary committee discussion.

> *'We believe that ICT is a vital area for the development of education over the coming years, but that* does not mean that each school needs to have a bespoke system created for it which differs from systems in all other schools. We recommend that information about systems in use is made widely known amongst authorities in later waves of BSF so that they can take advantage of the experience of *those which have already procured their ICT'.* (Public Accounts Committee, 2007)

ICT Managed services can now be added to the other PPP styles of provision in need of valid value for money (VfM) analysis. Hodge et al suggest this has yet to be done in any depth or quality.

> *'The veracity of the analytical studies underpinning evaluations assessing VfM for PPPs has been* *low, and the data being used for these studies have, to put it politely, been dirty'.* (2009, p.38)

Schools were right to question the value of a managed service at multiple levels. The supposed transfer of risk (Ball et al., 2007, p.307) to the MSP seemed not to have materialised as their services were constantly 'down'

or failed to match up to expectations, resulting in teaching and learning being disrupted rather than enhanced. Although reliability and functionality did improve over time, a legacy of lack of confidence remains. The 'risks' that Mahony et al refer to are largely commercial;

> *'It seems reasonable to suppose that the intermeshing of public and private spheres remains a potentially high risk strategy'*. (2011, p.353)

As the production of most technology sold to schools comes from the private sector it has always been a 'commercial affair' (Selwyn, 2010, p.68), although there is nothing surprising in that. What is to be questioned is whether schools were able to purchase what they needed or were sold what businesses could provide, so exerting a shaping influence on school technology (Selwyn, 2010, p.70). An illustrative case would be the growth in the availability of 'edutainment' products in the late 90's early 2000's, aimed not only at schools but also at parents and families, so further increasing the size of the market.

> *'The sales pitches for such material rely on an obsessive insistence that learning is inevitably 'fun'.* These new forms of edutainment are therefore offered both as an acceptable leisure-time pursuit, and as a glamorous alternative to the apparent tedium of much school work. Children, it is typically argued, will gain a competitive edge on their peers - and yet they will not even know that they are *learning'* (Buckingham & Scanlon, 2005, p.7)

I believe the marketing of 'edutainment' was a commercial opportunity that established (publishing) and newer (software) business organisations found too good to miss, regardless of the proven quality of their product. A PricewaterhouseCoopers report of 2002 entitled 'Market Assessment of the BBC's Digital Curriculum Proposition' which is referenced in a number of works (e.g. Buckingham, 2013) but is no longer available, estimated the annual UK market at £350 million without any sort of evaluation of their real worth.

> Edutainment or entertaining education is a new field of education reality. The evaluation of edutainment projects must be based on qualified monitoring of the ratio between the educational and entertaining activities related to the target group. Not all the products of the entertaining industry available on the market contain enough educational features. Often the entertaining part prevails which is based on the marketing point of view, is more attractive. (Němec & Trna, 2003, p.9)

Interactive Whiteboards (see 2.1.5) proved to be another example of a *'multi-*faceted policy opportunity for *business'* (Ball, 2007, p.49) in which a product developed for the Board Room was marketed at the classroom (along with presentation software) with such evangelistic vigour that LEAs felt compelled to provide them for schools out of central funds. VLE's are a similar case in point; 'Blackboard' emerged as a market leader in over 60 countries and reported revenues of over US$340m in 2009 (Selwyn, 2010, p.72). Despite some

attempts to develop the use of 'open source' applications for use in the education sector (Selwyn, 2013, p.64) the reality has been the ever increasing growth of private sector providers. Dale cites this as the dominant form of private sector interest in the school market (2009); Selwyn goes as far as calling school ICT provision 'privatised' (2010, p.69).

Therefore as each BSF project went to the market to purchase and build its own solutions, the result was a fragmented picture with no two solutions being the same. An opportunity for PfS to use its influence at the procurement stage to standardise provision and use economies of scale were lost, adding to the costly procurement process.

There are two other relevant outcome of this situation. Firstly, staff development time is continually soaked up with simple 'how to use' sessions; secondly, teachers moving schools can find the skills they have acquired and the resources they have developed useless.

None of the literature reviewed above on the use of ICT, government policy or the pressure from the business sectors seems to make any reference as to how learning takes place and how their product/policy/initiative is going to impact on it. The next section will therefore offer a brief summary of learning theory and how ICT may have an impact.

2.4   Theories of Learning and ICT

In order to understand how ICT may or may not promote the transformation of learning, this work will need to take time to reflect on the very concept of learning and the theories that attempt to describe it. Some established theories, for example Behaviourism and Cognitivism, possibly downplay the importance of human interactions involved, while Constructivism relates to the learner on their own, in context. Newer emerging theories are described by Illeris with this interesting observation in his introduction:

> *'Learning is also a very complex matter, and there is no generally accepted definition of the concept.* On the contrary, a great number of more-or-less special or overlapping theories are constantly being developed, some of them referring back to more traditional understanding, others trying to explore *new possibilities and ways of thinking'*. (Illeris, 2008, p.1)

Most of these theories evolved before the widespread use of ICT, however, many have evolved to adapt and include the new technologies, or even see a direct relationship, 'A complementary relationship exists between technology and constructivism, the implementation of each one benefiting the other, (Nanjappa & Grant, 2003). Constructivism is the theory accepted as that which embraces the learner at its centre as new knowledge is built upon the foundations of prior experience. No single author can claim ownership of the theory's origin (Lowenthal & Muth, 2008), it having evolved throughout the 20th century through the likes of Dewey (1916), Vygotsky, (1978), and Bruner (1992) to the present day (Sjoberg et al., 2007). As the theory of constructivism evolved, it became clear that learner interactions play a key role. Bruner contest the idea that learning is simply 'computational' and suggests a much more 'cultural nature of the mind' (2009). This builds on Vygotsky (1978) who evokes the importance of interaction between learners as they construct their own knowledge, a scenario that the use of technology is repeatedly described to facilitate, thus adding a social dimension resulting in the 'Social Constructivism' of learning (Palincsar, 1998).

In offering an almost diagrammatic representation of the location of constructivism in the learning process, Vygotsky put forward the concept of the Zone of Proximal Development (ZPD) (Kozulin et al., 2003, p.39), describing the point(s) at which learners, with the help of scaffolding provided by some external agency, advance their knowledge and understanding of particular principle or idea (Figure 3). This is used to challenge the pedagogy of the 'instructional' model of teaching (Williamson, 2010). Moreover, it also supports how ICT can enhance learning by putting the learner at the centre (Barbour & Rich, 2007).

Figure 3: Zone of Proximal Development
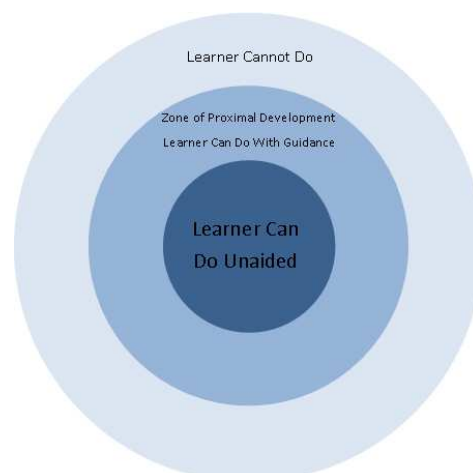
> *'An overemphasis on either inputs or outcomes harms the development of sound educational policies, whereby educators and students benefit from the construction of teaching and learning environments where they can express their opinions about social and individual needs, and have their concerns addressed'*. (Coupal, 2004, p.595)

There was even thought given to the design of learning spaces to promote constructivism (without technology) 10 years before BSF became real, indicating that an holistic approach to the learning environment was already documented (Honebein, 1996, p.6).

As theories of constructivism develop to embrace ICT the concept of Cognitive Load Theory has been offered as an attempt to understand how memory assimilates information from multiple sources (Kirschner, 2002). This is particularly relevant when instructional design and learning utilize the multimedia environment (when learners have access to multiple sources and samples of information in a range of text, audio and video formats at the same time) ICT can provide. The concept of Activity Theory first proposed in 1977 (Leontiev, 1977) offers a framework for understanding how individuals engage with their environment while learning. This sits well with some current thinking of modern students learning as 'Digital Natives' [4](Prensky, 2001) or the 'Net Generation' (Tapscott, 1997). Others agree; Dede proposes the emergence of 'neomillennial' learners because of 'the *prevalence of interfaces to virtual environments and augmented realities'* (2005, p.8). Detailed studies of these groups as they progressed their education found mixed evidence of the use and impact of ICT in learning (Bennett et al., 2008). Indeed they conclude the concept of 'Digital Natives' is flawed, with claims being made without evidence and potentially damaging as it 'obscures economic and social difference in young people's lives (Selwyn & Facer, 2013, p.2), Bennett et al. (2008) cite the concept of 'moral panic' as defined by Cohen (1980), when the popular media latch on to rhetoric that explains deviation from the norm

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[4] The concept of 'Digital Natives' is controversial and discussed throughout this work. However it does help as an adjective in describing individuals and populations born into a world rich with technology from the late 1980s onwards; that would make them in their late 20s or early 30s.

and assist in its propagation until it becomes accepted as fact (Thompson, 2013), a theory supported by Selwyn (2009, p.371). However, the term 'digital native' is useful in the context of this work (and others) in describing those whose whole lives have been lived in a technology rich world, particularly at the formative stages.

In trying to find a physiological answer to how learning takes place, increasingly important is the relationship between brain development, learning and 'neural plasticity', a phenomenon that suggests brain cells and neurons have the ability to alter their structure and connections in responses to 'external and internal pressures' (Kleim & Jones, 2008). If learning involves, as it must, physical and chemical changes to the synaptic connections made at the level of the neuron within the brain's neural cortex, (Caine & Caine, 1991) then the part that the use of ICT plays in teaching and learning in influencing those changes must be commented on.

> *'*Neuroscience is beginning to provide evidence for many principles of learning that have emerged from laboratory research, and it is showing how learning changes the physical structure of the brain and, with it, the functional organization of the brain. Neurocognitive research has contributed evidence that both the developing and the mature brain are structurally altered during learning*'.*
> (Committee on Developments in the Science of Learning (Ed), 2000, p.4)

In work on neurobiological science and moral development Narvaez et al explore the balance between the maturation of the nervous system and how it may be influenced by 'practice' in that the brains of 'experts' assimilate stimuli in their 'domain' more quickly and use less energy in doing so (2008, p.303). Hinton et al also point out '*recent advances in neuroscience heighten its relevance to education research'* (2008, p.87). They explore the 'genetics and experience' debate and see a false dichotomy in 'nature versus nurture'. They agree with the latest evidence from neuroscience research that the brain develops through 'a dynamic and *continuous interaction between biology and experience'* (2008, p.88) or as Smith points out 'all learning changes the brain' (2010, p.4). Friesen notes that potentialy 'a mature science of learning will soon discover its neural underpinnings and i*dentify the internal mechanisms that govern learning across ages and settings''* (2013, p.31).

It may be that if 'digital natives' do exist they are a product of living and learning with new technologies from childhood with brains whose connections have been influenced during growth and development. On the other hand, it just may be that some learners would always have been more comfortable in the multimedia environment that ICT offers, given that the world in which we evolved was largely a non-text based multi-

sensory environment. Mayer and Moreno certainly accept that we cannot ignore the need to investigate further the impact multimedia environments have on learning.

> 'The relation between psychology and education is a two-way street in which psychological theories can lead to improvements in educational practice and the challenges of realistic learning environments can help cognitive psychology build better theories. The study of multimedia learning *offers a potentially fruitful venue for improving both cognitive theory and educational practice'.* (2002, p.117)

This leads me to how the theory of 'Multiple Intelligence' (Gardner, 2006) relates to the use of ICT. He describes how students have varied ways of navigating learning and how different topics might require different approaches. While dissecting and describing the teaching process as a whole he accepts that 'understanding' from the learners' perspective very much depends upon a complex interaction of factors, many stemming from the previous experiences and 'biological and cultural background' of the learner (Gardner, 2009, p.107). If we are all different and complex in the methods we prefer to use when learning effectively, then the question arises as to whether or not ICT can enhance learning in some learners and hinder it in others. Similarly, if it has been accepted that the design of technology (or Human Computer Interaction) has to take into account a cultural dimension (Young, 2008), then surely we cannot accept that a uniform design to Learner Computer Interaction (my interpretation) is going to suit all learners.

> *'A richer account of changes in adolescent learning, and strategic and social behaviour requires a* multi-disciplinary approach that recognises the complex interaction between genetics, brain *structure, physiology and chemistry and the environment'.* (Blakemore & Choudhury, 2006, p.308)

So, rather than reflect learning theory, the use of ICT may well be both expanding our thinking and shaping its structure. This view is supported by Friesen, when in referring to the work of Biesta ((2006, p.17) he observes 'Certainly within educational technology as a field, this trend (establishing new theories of learning) has exercised the strongest influence on discourse as well as priorities and practice ' (2013, p.22). Selwyn also observes the need to update theories of learning with a theory of connectivism (2010, p.15) first presented as a 'Learning Theory for the Digital Age' by Siemen when he observes that traditional theories, while valid, do not take account of modern developments in technology.

> Behaviorism, cognitivism, and constructivism are the three broad learning theories most often utilized in the creation of instructional environments. These theories, however, were developed in a time when

> learning was not impacted through technology. Over the last twenty years, technology has reorganised how we live, how we communicate, and how we learn. Learning needs and theories that describe learning principles and processes should be reflective of underlying social environment. (Siemens, 2004, p.1)

Interestingly he uses the term 'reorganised' and thus avoiding 'transformed'. He also offers a complex

definition of connectivism but summarises it as:

> '.....the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual. (2004, p.3)

This development of learning theory has met with some acceptance and is helping to re-define it.

> Learning is the creation and removal of connections between the entities, or the adjustment of the strengths of those connections. A learning theory is, literally, a theory describing how these connections are created or adjusted. (Downes, 2012, p.9)

If the principles of learning apply to any individual in the process of acquiring new understanding, knowledge

and skills then in the context of this work members of teaching workforce must be consider as learners in their

own right. If we accept that teachers are 'digital immigrants' (Prensky, 2001), the difficulty of (particularly)

long serving professionals to embrace the potential of ICT may well have been overlooked, particularly when

considering approaches to their professional development.

So the learning of teachers needs to be added to the debate, faced with having both to use these new tools

within their professional lives while at the same time coming to terms with their own skills deficit (Davis &

Loveless, 2011). This work will review current evidence of both pupil and teacher experiences and add to it

data from a BSF environment intended to allow all stakeholders to benefit from the positive impact of

abundant ICT resourcing.

2.5 Teacher Professional Development and ICT

It must be said that BSF did attempt to, and largely succeed in, addressing some of the main hurdles in the

wide spread use of ICT in schools, but these were largely those relating to infrastructure, equipment and

reliability (Pelgrum & Law, 2003). Given the sums of money involved, both in capital and revenue terms that

is the least that could be expected. Appropriate CPD is essential if teachers were to take advantage of new

resources and this was recognized, in principle at least, in the need to include the professional development of teachers as a key focus in BSF projects, underlined by the dedicated CPD funding; a step in the right direction.

> Training teachers is a very expensive activity and hence, often much neglected in large-scale innovations. (Pelgrum, 2001)

There had been a realization that the teaching workforce had a skills gap with ICT as the last century ended. The MirandaNet project had, in 1999 summarized the factors that both supported and prevented ICT use (Cox et al., 2000). £230m of lottery money was earmarked to close that skills gap via the New Opportunities Fund (NOF) training initiative. However, there is little evidence that the design of the programme with what was often a 'distance learning' model produced successful outcomes (Galanouli et al., 2004). Ironically, there was little thought given to the learning process in the design of what was, after all, an adult learning programme, consequently there is no surprise in findings that suggest future CDP should embrace a constructivist approach (Twining & McCormick, 1999) rather than the top down instruction model employed by NOF. This idea is support by the findings of the Ripple Project (Mansell, 2011) that describes the almost organic development of a training model built around the concept of sharing of good practice amongst peers.

Indeed OFSTED's report of 2004 highlighted the feeling that the NOF training 'continued to disappoint' (OFSTED, 2004, p.4) but when schools provided their own training it was much more effective, a message that unfortunately BSF structures seemed to miss or ignore. Becta commissioned research published a warning in 2004, just as they were beginning to advise PfS and participating schools that teacher confidence needed to be addressed if the ICT element of BSF was to be embraced;

> *'A very significant determinant of teachers' le*vels of engagement in ICT is their level of confidence in using the technology. Teachers who have little or no confidence in using computers in their work will try to avoid them altogether'*. (Jones, 2004, p.3)

and that this confidence was affected by *'the amount of quality training'*.

There was already a considerable body of evidence at the turn of the century (Mumtaz, 2000) about the barriers to teacher use of ICT along with clues as to what might work to remove them. When asked what they wanted, teachers rated local support that encouraged the use of ICT to achieve their own goals as key (Williams et al., 2000). The MirandaNet report (Preston, 2004), while having a quality assurance focus,

reported some success, but only when the right chemistry of trainer type, school vision and committed teachers were key components. Focus on pupils was reported as being secondary due to the fact that teachers still struggled with their own skill set (Preston, 2004, p.51). Later reviews are little different. Davis et al promote an 'organic' approach that 'supports an ecological view of the diffusion of ICT innovation in education' (2009, p.861). If, as is suggested by Haydn and Barton that *'training teachers through distance learning in ICT proved to be more problematic than policy makers envisaged'* (2007, p.365), then the reliance of BSF on simplistic training models seems naïve, indeed some have described the it as 'unhelpful' (Haydn & Barton, 2007). As if to underline that they were clearly aware that barriers existed, in 2003 Becta had already published a 4 page summary that cited 8 key issues the research suggested prevented teachers embracing new technologies. Along with reliability and access to hardware, again teacher confidence and professional development figure highly (Becta, 2003), indeed the key role of teacher confidence in the change process was a recurring theme in many research findings of the decade (Lewin et al., 2009; Somekh, 2009; Underwood & Dillon, 2011).

These findings are not confined to the UK. From a Belgian study comes the conclusion *that 'for the majority of teachers, ICT training has only contributed to a lesser extent to ICT integration into the classroom'* (Tondeur et al., 2007, p.973) when a top down model is applied to CDP design. Although comparisons with similar research from, for example, the USA are not easy to make as their understanding of teaching and learning are somewhat different from our own, some concepts are international, like those of pedagogy and the measuring of success.

> 'Researchers must consider increases in teachers' knowledge levels and elevating their attitudes and confidence. Moreover, these constructs are tied not just to knowing how to use a particular piece of technology or software or to the belief students in the 21st Century must engage with technology on a regular basis: they are also centrally tied to a teacher's understanding of pedagogy (i.e.. pedagogical content knowledge) and to how these various technologies can facilitate learning and achievement among students and to how to assess the various outcomes of learning in these contexts'. (Lawless & Pellegrino, 2007, p.596)

There is an early conclusion emerging that the BSF programme, although seemingly embracing the need for teacher professional development, failed to take notice of two key evidence bases. Firstly how teachers learn and the barriers to that process, and secondly the often failed attempts at CPD programmes of the (recent) past. All too often staff training in ICT is dealt with in isolation rather than holistically, and as Mainka relates:

' ....leave staff feeling alienated and unable to apply the facilitator's hierarchical PowerPoint slide presentation to their own areas of practice' and not 'making staff development for technology an integral part of academics' lives' (2007).

Too little about individual teachers is taken into account. Adding computer technology to the everyday life of professionals who already have considerable pressure being applied from internal and external sources causes 'turbulence' (Day et al., 2006, p.613) and is unlikely to lead to positive outcomes without 'mediation' (Subramaniam, 2007, p.1068). Adding to that was the fact that familiar old school buildings were to close in July and their activities transferred to new ICT rich ones in September, a process and time scale that added multiple pressures to everyone involved.

Management consultants McKinsey were first commissioned to investigate the world's best schools to find out what made them tick in 2007 (McKinsey, 2007); the report was updated at a later date. The researchers came to the conclusions that three features were common the top school systems:

1. getting the right people to become teachers;
2. developing them into effective instructors;
3. ensuring that the system is able to deliver the best possible teaching to each child.

Although the use of the term 'instruction' is value laden and implies a transmission approach to teaching and learning, these three findings sit well within the structure of this work in that it supports the need to look at how well the teaching workforces was prepared for the delivery of the ideals of BSF, how well they were supported as they moved into a technology enriched environment and how fit for purpose that environment was. Interestingly, 'The Variations in Teachers' Work, Lives and their Effects on Pupils' (VITAE) research commissioned by the Department for Education and Skills (DfES) and conducted between 2001 and 2005 concluded that less change and turmoil in teachers' lives would improve their effectiveness (Sammons et al., 2007).

Up to this point I have almost assumed an instructional approach to CPD that ignores the role emotion plays in learning as supported by current neuroscience research (Hinton et al., 2008) which, along with the well-established principle (and the biochemistry behind it) that stress disrupts learning (McEwen & Sapolsky, 1995). The reality was that a large proportion of teachers were not emotionally involved with the BSF project and a significant number were stressed by the thought of the pressure to embrace their new technology rich environment, much of which they judged to be beyond their influence.

Afshari et al (2009) categorise factors affecting teachers' use of ICT as *'non-manipulative and manipulative*

school and teacher factors' (2009, p.79). Non manipulative factors are;

> *'..factors that cannot be influenced directly by the school, such as age, teaching experience, computer experience of the teacher or governmental policy and the availability of external support for schools'* (2009, p.80),

while manipulative factors refers to;

> *'*the attitudes of teachers towards teaching and ICT, ICT knowledge and skills of teachers, *commitment of the school towards the implementation process and availability of ICT support'*,

thus inferring that teachers use of ICT can be affected by internal and external factors. In referencing a report

from the USA (NCATE, 1997) they offer the observation;

> *'*that teachers with fewer years of experience were more likely to use computers in their classes than teacher*s with more years of experience'* (2009, p.80).

This conclusion pre-dates the digital native debate but does in some ways reflect its premise that the next

generation of teachers may be more at home with technology in the classroom that their predecessors.

Burke illustrates how teacher training and in-service training was a 'critical element' in post war (1945-1974)

developments and uses the term transformation (2010, p.69) although within a grounded approach to

incremental change, a time and capacity luxury teachers in BSF schools were largely denied, or at least have

been since the opening of their new schools and the publication of this work. What was lacking then (and

remains so) are the systems and resources to allow for the development of formal and informal professional

networks that are so important in the professional development of teachers and educations leaders. As the

educational historian Cunningham points out *we still need to account for human intercourse and activity in*

the promotion of education reform' (2001, p.433).

The observations of Somekh are also worthy of note and should give teachers some comfort;

> *'Rather than teachers being somehow to blame for the lack of pedagogical transformation when ICT* is introduced, (this chapter will argue that) the failure lies with both policy-makers and evaluators *who have little understanding of the process of technological innovation'.* (2009, p.450)

Starved of funding for CPD from the considerable BSF capital, schools constructed their usual internal

'communities of practice' models that had served them well through other times of change (Preston & Cuthell,

2007). Rarely did they go beyond the boundaries of their own organization for CPD and never was funding to support it obtained from the BSF budget.

So, I believe we still have a poorly defined structure for teacher CPD that is yet to embrace the requirements and systems of the 21st century (Leask & Younie, 2010). It is unlikely that any top down model will succeed without taking account of 'contextual inertia' and sensitivity to 'teachers' personal mission' (Goodson, 2001, p.53). Certainly CPD on the use of ICT leaves teachers feeling at best disappointed and at worst let down.

> However, based on what we do know about professional development programs in this area (ICT), it is highly likely that the quality of the training offered to them leaves much to be desired. (Lawless & Pellegrino, 2007, p.578)

So, without putting the expectations of the use of ICT in their teaching into context and adequate training to support its use teachers simply acquire 'an appropriate level of proficiency' (Edwards, 2012, p.86), what I will refer to later as their 'comfort zone', leaving little change in established 'teacher centered' pedagogy (Gibson, 2001, p.41) and going against the hope of 'the integration of ICT (being) associated with a shift from instructivist to constructivist philosophies of teaching and learning' (Afshari et al., 2009, p.98).

Collectively, this literature review appears to highlight more questions than it offers answers or explanations. In fact I would argue that a recurring theme is one of conflict between agendas and ideologies. Firstly, what is still to be resolved is the educational conflict between traditional practices and transformation, secondly comes the difference in principles between those of the market versus public service, thirdly the clash between published research evidence and the detail of government policy and legislation and lastly the conflicting pressures on the capacity teachers have to respond to a constant stream of new expectations in the climate of accountability.

To further quote Afshari et al and their concept of 'manipulative factors':

> 'Teachers must have opportunities to study, observe, reflect, and discuss their practice including their use of ICT, in order to develop a sound pedagogy that *incorporates technology'*. (2009, p.84)

This highlights the need to consider teachers as learners, specifically here in the use of ICT. As such their ZPD (on page 39) in this context needs to be a concept around which CPD is designed in order, as Nyikos et al state, to allow for 'scaffolded guidance' without which success will be limited.

'One primary observation arising is that without a strongly supportive social component the potential *for learning (or ZPD) for both the individual and the group, was radically undermined'.* (1997, p.516)

3 Chapter 3: Research Methods

3.1 Research Background

As a student of Zoology at Newcastle University I was drawn to the study of animal behaviour and was the only undergraduate on the Newcastle University 1974 Expedition to Kenya. Our group of 3 was to study the behaviour of a family of social fish species living in coral heads. For this we dived twice a day in all conditions. While I wrestled with the current research methods, I cannot help reflect that none of the problems I have experienced will match trying to make objective observations (and write them down) while bobbing up and down in a sea swell, one mile from the shore, in water that had recently recorded the catching of a 2 metre tiger shark. Although we spent hours recording behaviours in quantitative categories, it was the late evening (qualitative) conversations, when data was discussed and observation were shared under mosquito nets that added the colour and detail to the final report. I was left with the firm belief that it was possible to observe the most complex social interaction in diverse situations, and using the right methodologies, obtain empirical evidence and make sense of it.

It was twenty years later before I was able to pick up another research opportunity. I was drawn to the Newcastle University's Centre for Evaluation and Monitoring (CEM) initiative that had developed quantitative tools to assess school performance at the pupil level that took, for the first time, prior attainment data and plotted that against future attainment. With country wide data sets they could calculate national norms and compare those with individual student, school, subject or teacher outputs. Although I did not know it at the time, the road to school league tables and contextual value added measures was under construction. Through my Master's Degree work (Haw, 1996) I was able to renew my acquaintance with statistics and broaden my understanding of research methods. In choosing to study the impact of OFSTED on school improvement from the perspective of the classroom teacher I got close to the feelings of practitioners as all of

our local schools went through their first inspections. I designed the research on the impact of the first round of Ofsted inspection using a quantitative instrument, but it was the 'open' responses and un-planned conversations that provided the most insight. For the first time I was beginning to open my thinking to mixed methodologies. I graduated with distinction.

Currently working as a Deputy Head Teacher in the evaluation of teaching and learning and school improvement it is clear to me that while the analysis of performance of school that produces league tables gives details of value added attainment, it is the observation of teaching and learning and conversations with teachers and learners that really explain what is happening and why, such is the complexity of what happens in the classroom (Wragg, 1999).

Inevitably my previous experiences have had a major influence on the planning and implementation of this work. I believe there is a clear need for educational research to be sufficiently robust and reliable to influence education policy and practice whenever possible. The title and intentions of this work are almost a progression from my previous research; the impact of the first wave of Ofsted inspections on school improvement. Again I intended to look at the impact of a major piece of government legislation and investment on school improvement, from the perspective of those in the classroom. The problem here was scoping a project big enough to achieve meaningful outcome while keeping it manageable; BSF was a massive project with high expectations, delivered within the context of an increasingly turbulent education sector. Perhaps I should not even have entertained the idea considering; *'The more pr*ogrammatic a change, the less comprehensive an *overview is feasible since no individual can share the experience of everyone involved'* (Wallace, 2008, p.7).

3.2   Research Question

Deciding upon specific research questions was not without challenge. Prior to Building Schools for the Future there were many studies on the impact of ICT on teaching and learning adding to a growing body of evidence around the use of ICT in education that goes back over 20 years; however it has been an uphill task for researchers to keep up with the pace of change, both in terms of education and technology. For example, Perry summarised the impact of handheld devices (called PDAs then) in secondary schools settings (2003) and, as we have seen, Passey et al. (2004) studied the impact of ICT investment on intermediate outcomes, in

particular pupil motivation. Not surprisingly they were both able to find many examples of positive effects. However, this and many other studies were conducted prior to BSF in areas of limited investment where expectations were at a much lower, localised level. Transformation of teaching and learning on the scale expected by BSF was certainly not one of them (Hennessy et al., 2005) perhaps because the focus was on the technology not on the teacher and pupil. Amongst the work on school environments are many references to ICT and in particular its role in engaging students (John & Sutherland, 2004; Newhouse, 2002; Passey et al., 2004; Underwood et al., 2008).While some authors do try and consider the impact on learning, the output measures relate largely to basic attainment statistics (Somekh et al., 2007). As yet, there has been little published material on the transformational use of ICT in projects of the size of BSF.

The first Annual Report evaluating BSF produced by accountants PricewaterhouseCoopers was published in 2007 (PricewaterhouseCoopers LLP, 2007). The Literature Review from the Technical Report is also available as a separate document and runs to 6 pages. They conclude with 5 lessons learned:

- Learn from best practice and share information;

- Effectively consult all stakeholders;

- Ensure appropriate resources in terms of finance, time and people;

- Provide and make effective use of appropriate guidance and information; and

- Ensure greater involvement of educationalists.

 Two subsequent BSF reports were published (PricewaterhouseCoopers LLP, 2008; 2010). Each tried to gather information on the impact and successes of BSF. Having been part of their data sample and granted access to the full reports before publication and although cannot disagree with headline advice, I was struck by how generalized were their conclusions, so it became my intention to use my unique position to investigate the impact of the ICT component of the BSF process from the point of view of teachers and learners.Thus the main research questions of this work evolved to ask:

To what extent and in what ways has the investment in ICT made by BSF helped transform teaching and learning and what are the perspective of this from the three main stakeholder groups; those leading, those teaching and those learning?

3.3   Research Methodology

'It is incumbent on qualitative researchers to document their research procedure in detail for reliability to be calculated'. (Basit, 2010, p.70)

3.3.1   The Research Landscape in the Context of Education

Designing a long term research project in any education context can prove challenging as the landscape continually changes. This project had the potential to be a classic example of that reality; within 12 months of the beginning of this work a new coalition government cancelled the BSF programme, almost overnight. Of the schools I had selected to work with, unfavourable OFSTED reports and changes of Head Teacher altered the priorities in 5 of the schools. Adapting the project to respond to these external pressures proved a challenged to its very existence, a situation that is reflected upon later in this report. A further threat was to follow. The first 18 months of the schools' contract with the Managed Service Provider were fraught with issues of poor functionality that left schools feeling at best disappointed and at worst litigious. Payments were withheld, refunds offered in compensation and legal teams engaged. None of this helped schools to feel anything other than let down by ICT, considering the visions they had been encouraged to write. As Wallace points out:

*'Visionary rhetoric is especially vulnerable to semantic irony. There is a designed-*in disjunction between the lofty aspirational rhetoric and the more humdrum organizational reality that is *experienced.'* (2008, p.5)

Consequently, expectations were high and promises had been made, but very little was actually delivered. In this climate any approach asking questions about the transformational impact of ICT elicited short replies of little use as research data. A crucial block to the success of ICT in schools, that of reliability, was to have been addressed by MSPs. Instead Head Teachers felt that far from teething troubles, the service was fundamentally flawed in its design and hardly fit for purpose. Teachers felt this and pupils were able to observe and articulate their teachers' frustrations. This caused me to reflect on how much of an under-used resource pupils are. Perhaps we should all use them more as researchers rather than passive recipients (Goodson, 1999, p.295). As a result of poor functionality it was 12 months into the programme (and this research) before the ICT provision was considered robust enough to have an impact. However, those early experiences cast a long

shadow that hung over the Partnership, ended after its 5th year. Teaching and learning had, if anything suffered rather than felt transformed as teachers vociferously reported difficulties through both formal and informal channels. Such was the concern that the CEO of the MSP paid us a personal visit to apologise for the poor quality of key parts of the service. Shortly afterwards he 'moved on'.

3.3.2 Evolving a Methodology

Too often the education process itself is treated as a series of black boxes (Cuban, 2013, p.8; Black & Wiliam, 1998), where we only measure the inputs and output. In this study there would be the need to get inside a number of those boxes, be they schools, classrooms or the heads of individuals. Far from being controlled, controllable and predictable the changes expected (and to be measured here) are more likely to be governed by complexity (Wallace & Pocklington, 2002, p.25).

> *'One of the most profound results of complex system research is that when systems are highly* complex, individuals matter.*'* (Bar-Yam, 2005, p.10).

In order to conduct research in education we need to 'conquer enormous complexity' (Berliner, 2002, p.20) and as such a whole range of research methodologies must be embraced.

> *'Therefore, ethnographic research is crucial, as are case studies, survey research, time series, design* experiments, action research, and other means to collect reliable evidence for engaging in unfettered *arguments about education issues'.* (2002, p.20)

BSF's thinking was clear from the start, ICT would transform teaching and learning (Fig.1, page 9), consequently it should have been possible to design a project to investigate it as a simple 'cause and effect' model. A positivist approach to the research could deliver findings to back it up (or refute it). This would require an objective view of evidence based on 'before' and 'after' observation, there being no potential for a control group. However, this would result in a study that resembled the much criticised OFSTED model (Alexander, 2013; Fielding, 2001; Shaw et al., 2003), in that a lesson, once observed, being graded with 'transformation' scores and ultimately schools being given summative grades. So a positivist approach sits very uncomfortably in this context (Cohen et al., 2007, p.11) where as a post-positivist, interpretive

methodology that accepts 'social reality is constructed and it is constructed differently by different individuals' (Gall et al., 1995, p.19) would be more suited.

Approaches to research methods in education have long been debated (Cohen et al., 2007) with what seems like a permanent conflict (Onwuegbuzie & Leech, 2005) between the values of two polarized methodologies,

> 'Throughout the 20th century, an uncompromising rift has prevailed between quantitative and qualitative researchers'. (Onwuegbuzie & Daniel, 2003, p.5)

a division fraught with the 'politics of legitimacy'(Hughes, 2006) that I believe, is a symptom of an underlying lack of confidence in qualitative methods.

 Such a division seems counter-productive if the aim of research design is 'scaffolding' to 'provide researchers stability' to do 'their own building' (Crotty, 1998, p.2), and yet the research community seems to anguish over the relative merits of different methodologies (Adams & Roulston, 2006). Surely a more pragmatic approach to research design would be more productive? After all, 'epistemological purity does not get research done' (Miles & Huberman, 1984, p.21).

 The merits of quantitative methods have long been established as 'scientific and objective' (Hughes, 1997) and its statistical methodologies alone considered as synonymous with research; *'Research* then as it comes to *be known publicly, is a synonym for quantitative research'* (Bogdan & Biklen, 1998, p.4). The reality is it is just as possible for researchers to design and carry out quantitative research with fundamental flaws (Long, 1988). Mark Twain credited Benjamin Disraeli with the phrase 'lies, damned lies and statistics' in the 19th Century. Onwuegbuzie catalogues a number of typical errors in quantitative research methodology and ponders on how much 'published educational research is invalid' (Onwuegbuzie & Daniel, 2003, p.35). Meanwhile, the status of qualitative design has been represented by opposing views; in one year it was seen as 'mature and thriving' (Denzin et al., 2006, p.778) or 'in quite a state' (Wright, 2006, p.793). The struggle appears to be around validity, reliability and triangulation (Winter, 2000). Thankfully, redefining these concepts as 'trustworthiness, rigor and convergence from multiple sources' (Golafshani, 2003, p.602) has moved the debate on. However, even after offering tables of validity criteria and techniques, Whittemore et al still conclude 'further development of validity criteria requires ongoing dialogue' (2001, p.535). Creswell and

Miller offer 9 'validity procedures' (2000, p.126) to help researchers like myself feel confident that their work will stand up to scrutiny.

The reality is both methodologies have their strengths and weaknesses, they are 'different but one approach is not superior to the other' (Carr, 2008, p.716). If we put aside the dichotomy and embrace an 'epistemological continuum' (Onwuegbuzie, 2002, p.518), then it is possible to see how quantitative and qualitative methodologies can be complimentary and combined in one study (Onwuegbuzie & Leech, 2005).
 A significant proportion, but not all (Symonds & Gorard, 2010) of those researching in social science contexts accept a 'mixed method' or 'mixed design' as a valid and powerful approach (Hammond, 2005) where qualitative and quantitative data are seen as 'complimentary' (Brannen, 2005, p.12) and 'provide a better understanding of research problems' than either approach could on its own (Creswell & Clark, 2010, p.12) even though there are issues to be aware of (Bryman, 2006). As Johnson and Onwuegbuzie claim, *'Mixed Methods Research: A Research Paradigm Whose Time Has Come'* (2004, p.14).
 The reality for me therefore was that a mixed method (Hakim, 2000) (Onwuegbuzie & Leech, 2005) (Basit, 2010, p.17) would best serve this work, although qualitative data was to form the major part. This follows my increasing belief that only by gathering the detail of individual experiences is it possible to understand the lived experience of stakeholders. Such an approach has rapidly gained support and credibility in social science research.

> *'All human and social activity is contextual, and that the context is fundamental in determining the nature of any phenomenon which is investigated'*. (Hodkinson, 2002, p.450)

The notion of 'telling better stories' as described by, for example Hodkinson, (2004) and Elliott (2005) clearly challenges the fact that sampling and analysis should be the prime mover in a context were social, cultural and emotional values predominate and affect outcomes. This resurgence in both the value of, and confidence in, qualitative data is further developed by Gardner & Galanouli (2004) and allows Creswell to claim 'that today qualitative research is legitimate in its own right and does not need to be compared to achieve respectability' (2007, p.16). However, it does need to be rigorous in its own way (Creswell & Miller, 2000; Winter, 2000). In a different but parallel publication he also supports the use of mixed method in order to improve the 'overall strength of a study' (Creswell, 2008, p.4).

The result was I felt I needed to develop a methodology that, while embracing some of the scientific method and the collection of empirical data, would include a strong interpretivist dimension that gathers and describes individuals' behaviours within and the understanding of their world.

3.3.3 Design

This sub-section is crucial in understanding how external pressures determined the design of this work, resulting in a mixed method case study, conducted by an insider, with action research potential. The challenge was to design a manageable project with enough scope to generate data that would stand up to tests of validity and reliability (see 3.4.5) with a methodology that took into account both the complexity and uniqueness of this situation; in a volatile landscape. While offering 'Ten Steps' to follow in research design I was particularly drawn by Chenail's advice to 'keep it simple' (2011, p.1717)

A fundamental need at the outset was to construct the concept of 'transformation' and evaluate it (see 1.5 and 2.1). This was possibly the most difficult task of all, to further quote Draper and Nicol, 'Transformation is a perception, and stakeholders seldom share it' (Draper & Nicol, 2006, p.1). It was unlikely that this concept would be viewed or understood in the same way by those asked to participate in this work and yet it would be by their understanding of it that responses to questions would arise.

> Is it better? What do we mean by better? Are my lessons better? Who is the judge of that? Is it different or very different? Have I learnt more? How will that be tested? Have I enjoyed it more? Has that enjoyment lead to improved attainment? In this population? Compared to the previous population?

The possible questions are endless. So, what questions would be asked and to whom would be key (P3,4,5&6).

However, I was certain of one thing; at a national level transformation would continue to be measured using instruments already in place. Attainment data, attendance figures and league tables, VA (Value Added) statistics and the size of the NEET (Not in Education, Employment or Training) population will always figure strongly. Indeed the Guardian newspaper of July 2012 reported such findings that had not been made public.

> 'The report, which has now been disclosed under Freedom of Information legislation, says that schools rebuilt under BSF showed "significant" improvements in exam results and declining truancy'. (Vasagar, 2012)

3.3.3.1 *From the Inside*

Having been seconded to work for the LA, for two days a week (P4.2) to assist in the transformational process there was an expectation that I would work with schools, teachers and learners. Consequently on the surface at least, access as a researcher was not an issue; neither was my opportunity to stay engaged. All of the professionals I contacted for this work knew me well; they were familiar with my own situation. I had (and still do) worked with them in a variety of capacities over a number of years. As part of the secondment I had delivered INSET (P4.3) and offered support around the implementation of the BSF programme. I was an 'insider' at every level.

The issues for researchers working within their own 'society' have long been documented. Burgess (1984, pp.21–22) reflects on the nature of studying a too familiar setting. The positive and negative aspects of working as a researcher from 'the inside' had to be accepted as a key influence on this work (Sikes & Potts, 2008). Smyth and Holian note that research from within is 'different not worse or better' and 'worthwhile and special' offering 'a unique perspective' because of the researchers' 'unique perspective and knowledge of the history and culture of the people and institution involved' (2008, pp.35–37).

Robson goes further in the advantages accorded to the insider;

> *'You don'*t have to travel far. Generally you will have an intimate knowledge of the context of the study, not only as it is at present but in a historical or developmental perspective. You should know the politics of the institution, not only of the formal hierarch*y but also how it 'really works' (or, at* least, an unexamined commonsense view of this). You will know how best to approach people. You *should have 'street credibility' as someone who will understand what the job entails, what its stresses* and strains are. In general, you will already have in your head a great deal of information which it takes an outsider a long time to acquire*'. (2011, p.297)

However, as the insider I would need to be able to maintain a 'critical distance' (Drake & Heath, 2011, p.5). With insider research there is always the need to consider the complexity that ethical issues add in planning and execution, particularly in this case when 'personal and professional relationships will need to be sustained' (Floyd & Arthur, 2012, p.9). Ethical issues related to insider research are well documented (Floyd & Arthur, 2010; Taylor, 2011; Unluer, 2012) and as such I needed to be fully aware of their implications

throughout this work, particularly when conducting interviews with my own colleagues and observing their lessons.

The secondment had put me right at the centre as a key player in the change process relating to BSF and ICT and required a close working relationship with the participants. The least that those who provided the funding and time would expect was feedback on how they could best use ICT investment, wherever their resources were to come from in the future. In fact as the contract with the MSP reached its halfway point I was already involved, at a Local Authority strategy level, on the assessment of its success and planning for what happens in 2014 when the current contract expires. I will potentially remain an insider long after this work is complete. This study could have been seen as moving marginally into action research territory and in many ways the original plan was very much embedded there. Cohen et al (2007) list teaching methods, learning strategies, and CPD amongst key areas in which action research can have an impact. In the same text (p299) they quote from Hult and Lennung (1980) and McKennan (1996) and list 22 characteristics of action research that almost match exactly the fusion of my secondment and this research. Unfortunately, the cancellation of BSF removed the potential to engage with schools officially in the next phase and use the findings from this one to complete several cycles of research and action. However, I remained involved at Local Authority strategy level and the potential of making professional impact remains intact, particularly in relation to my own organisation.

3.3.3.2 *Towards a Case Study*

In trying to distil all of this evidence into a coherent practical plan I was mindful of Silverman's observation that beginning researchers can be 'too ambitious' (2006, p.30). Helpfully, Creswell takes what he calls a 'baffling number of choices of approaches' (2007, p.6) and distills them to 5. This work falls clearly into his description of a 'case study'.

> Case study; an issue explored through one or one or more cases within a bounded system, setting or *context'* (2007, p.73) .

Case studies, according to Stake, have 'become one of the most common ways to do qualitative research' (2005, p.443), although Yin, in his introduction suggests their design is the 'weak sibling' the use of which 'is one of the most challenging of all social science endeavours' (2003, p.1). However he does, in later work offer advice on design that this work embraced (Yin, 2008).

If, as Gillham describes a 'case' as:

- a unit of human activity embedded in the real world;

- which can only be studied or understood in context;

- which exists in the here and now;

- that merges in with its context so that precise boundaries are difficult to draw;

and can be 'an individual, a group, an institution, a community' or' multiples' of these (Gillham, 2000, p.1) then this work can clearly considered to be one. The context is crucial here and therefore defines the 'case'. Although there were BSF projects taking place all over the country, there was little attempt to link them up in any way except at the highest strategic level, they all developed at a local level, one outcome of which was criticisms of the huge amount of money wasted on procurement and design costs alone. Each operated as an entirely separate entity. There were three neighbouring LAs in my region alone at varying stages of BSF development. Not once were they encouraged to talk to each other or share their experience; each ended up with completely different solutions. This fact helped to define the boundaries of this work. Even within our own BSF project individual schools became autonomous once the MSP had been appointed. This drew my research boundaries even tighter. However, considering the reliability and validity issues discussed above, it became important not to design the work around only one school. Varying amounts of data were collected from three BSF Partnership schools to ensure 'credibility and trustworthiness' (Creswell & Miller, 2000, p.126).

However, my own school would be the primary organisation at the centre of this work. A successful 11-16 state comprehensive school in the North East of England, it grew from slightly below average size (970 pupils) to above (1025 pupils) during the timescale of the study. Pupils were described as 'of broadly average' ability on intake but leave with attainment levels 'well above national averages' using school league table

measures. Statistic record the school as almost universally 'White British', while the number of pupils with 'Special Educational Needs' is above the national average, largely due to the school's inclusive education policy and a provision for pupils with physical disabilities. Ofsted describe the school as 'good', and particularly comment upon the quality of teaching, leadership and curriculum provision. The school's 'Inclusive Ethos' is recognized and applauded.

The final design was therefore based on case study principles employing mixed methods of data collection carried out by an insider, with the potential for action and improvement in the traditions of action research.

3.4   The Plan

Despite the dramatic changes to the local BSF landscape since the original research plan was proposed, the basic research methodology of the original proposal remained unchanged. The collection of qualitative data through a series of semi- structured interviews with all stakeholder groups (Head Teachers, teachers, pupils and ITT students) was conducted over a period of 2 years.

There was little, if any, evidence collected on what the impact of ICT was in these schools before BSF. Schools would also go through a transition and development period during and after BSF, there would be no specific 'end point' to collect data, although repeated attempts were made by PFS (PricewaterhouseCoopers LLP, 2010).

3.4.1   Early Exploratory Research

In 2007 I had devised a questionnaire based study at the early stages of BSF implementation, 12 months before this work was proposed. It ran with some success and was the seed that germinated into this work (P2). I began to see it retrospectively as a 'pilot study'.

> 'It (data gathering) begins before there is commitment to do the study; back-grounding, acquaintance with other cases, first impressions. A considerable proportion of all data is impressionistic, picked up informally as the researcher first becomes acquainted with the case'. (Stake, 1995, p.49)

However the outcomes proved to be little more than a training needs analysis and lacked the insight required.

The questionnaires gave a large number of data items but what they gained in quantity they may have lost in

depth and detail as the 'individual gets lost' (Black, 1999, p.6), or there is 'an inability to infer meaning beyond the results achieved through statistical analysis' (Castellan, 2010, p.12). Consequently, although the 2007 work was never really intended as a pilot study it essentially became one and so will be referred to as such in this work (see 1.3 above).

The flow of development of this work is set out in Figure 4: Development of Research.

3.4.2 Instruments

Three types of data were used throughout the research: Interviews, Questionnaires and Lesson Observations, each offering a different perspective on the research question and helping in issues of reliability and validity. In doing so I am drawn to the work of Draper and Nicol and their observation of the importance of stakeholders.

> *'To understand important transformative events, we must ide*ntify enabling conditions as well as precipitating triggers. Cases and considerations such as these implicitly show the immense challenge of designing evaluations that see through the impressions of stakeholders (whether dazzled or "not bovvered") to detec*t change of real substance'.* (2006, p.1)
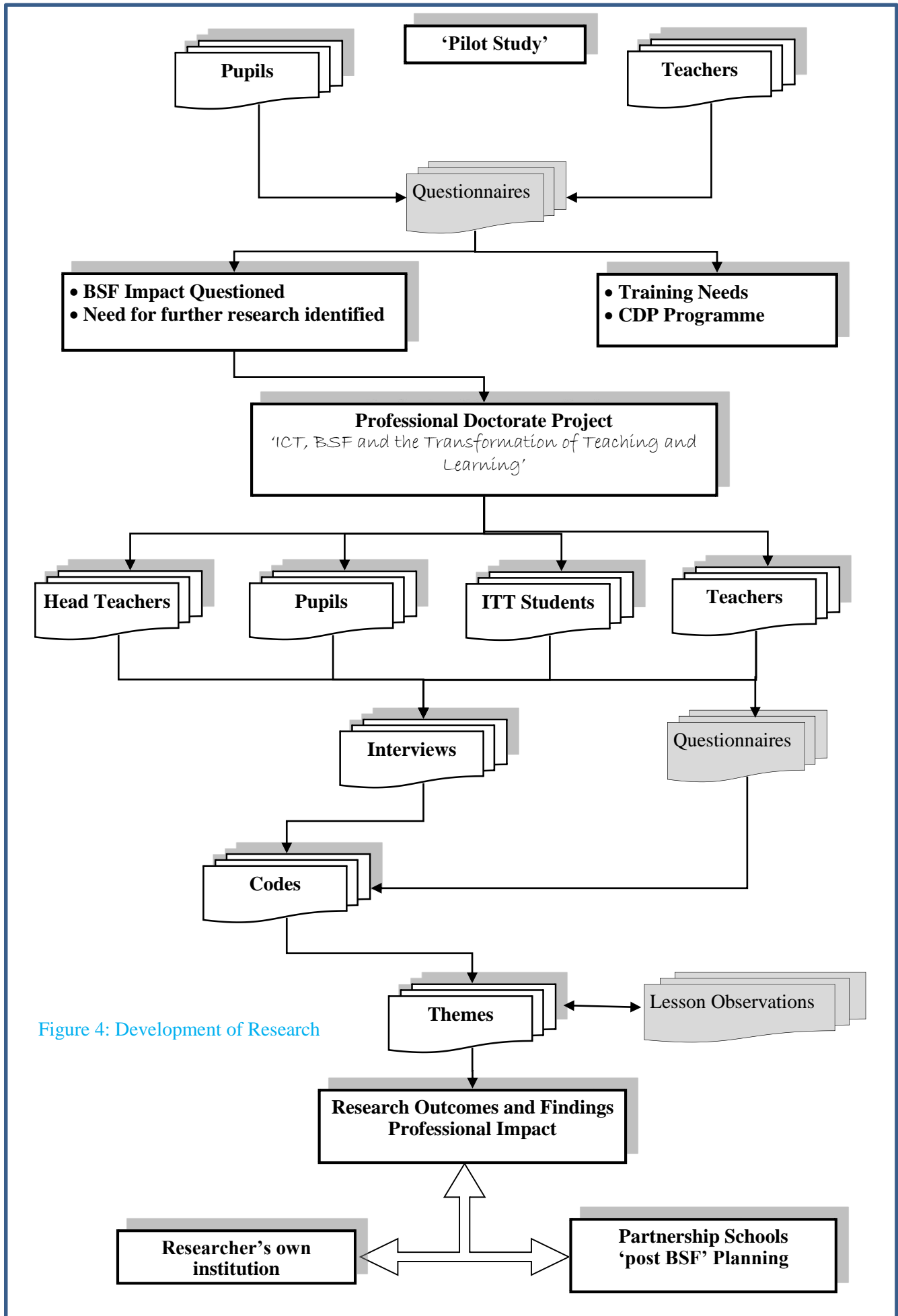
'Pilot Study'

Pupils

Teachers

Questionnaires

- **BSF Impact Questioned**
- **Need for further research identified**

- **Training Needs**
- **CDP Programme**

Professional Doctorate Project
'ICT, BSF and the Transformation of Teaching and Learning'

Head Teachers

Pupils

ITT Students

Teachers

Interviews

Questionnaires

Codes

Figure 4: Development of Research

Themes

Lesson Observations

Research Outcomes and Findings
Professional Impact

Researcher's own institution

Partnership Schools 'post BSF' Planning

3.4.2.1 *Interviews*

The main research instruments were semi-structured interviews. Interviewees were asked to 'give me half an hour'; in practice many ran closer to an hour. As well as having the important 'face to face' element (Opdenakker, 2006) they allow for flexibility, sensitivity and for the collection of large amount of reliable detail that it is possible to analyse, all be it not without challenge.

The World Health Organisation recommend the use of semi-structured interviews in the need to investigate medication use and, I would suggest, that is one of their weaknesses; 'researcher needs to know something of the local culture to capture the interviewees real meaning', is actually a strength of this work (Hardon et al., 2004, p.28). Having accepted the value of a post-positive interpretive methodology, it would seem logical to embrace a technique established as 'useful for investigating complex behaviours, opinions and *emotions and for collecting a diversity of experience'* (Longhurst, 2010, p.112). Although interview records represent recollections or interpretations rather than records of what actually happened, they at least gave more rounded findings from a (small) sample and give a chance for reflection; they give an insight into what people do and think.

> *'We interview people to find out from them those things we cannot directly observe.....We cannot* observe feelings, thoughts and intentions. We cannot observe behaviors that took place at some previous point in time. We cannot observe situations that preclude the presence of an observer. We cannot observe how people have organized the world and the meanings they attach to what goes on in the world. We have to ask people questions about those things. The purpose of interviewing then is to allow us to *enter into the other person's perspective'*. (Patton, 2001, p.340)

Although I understood the need to test both interview technique and structure it was difficult to test the Head Teacher interviews as the pool of participants was small. As such I was careful to select as my first school leader a colleague who I knew would have the time and patience to help me revise the structure of interview as it progressed. I interviewed him in his own home; we had more time. The teacher questions were tested and revised following a trial interview; to allow for some triangulation I modelled the questions for both pupils and ITT student on these. All interviews were recorded digitally and transcribed (P5.1-4).

3.4.2.2 *Sample*

The choice of participants used for interviews was from those whose roles were already established by their membership of an identifiable group within their organization. This made access and organisation easier. This non-probability or 'purposive' sampling, *'selecting interviewees or focus group participants by virtue of characteristics thought by the researcher to be likely to have some bearing on their perceptions and experience'* (Barbour, 2007, p.52) I hoped, would improve the quality of data collected.

In my initial telephone calls I explained the context of the meeting as part of this research. I did offer to follow that meeting up with further work in their school should they request it. However, I could never be seen as an independent observer and researcher having already played a key role in the change process; impartiality was not an option. This raised issues of both ethics and confidentiality. Indeed, deciding on a largely qualitative methodology increased the risk of ethical problems. So, while following the general principles of good qualitative research (Mason, 2002, p.45), participants who provided data were to understand clearly the use of what they provide would be put. De Laine (2000) records evidence where a close relationship between researcher and participant are exploitative if the purpose of the work is disguised in any way. The way in which I was (and still am) perceived by participants was influenced by their perception of my role and the ethics of our professional relationship during and after the research that I needed to be fully aware of (Floyd & Arthur, 2012).

Data was collected from:

- 4 Head Teacher interviews (P5.1)

Gaining access to Head Teachers for research purposes is not easy. Of the 8 available within the boundaries of this study (the BSF schools), half were likely to remain out of reach due to the situation they found themselves in; poor Ofsted reports, budget difficulties and moving to new post among them. I knew the other four well, I had worked with them on many occasions. Two were from one school, the substantive Head who was on secondment to the LA and his 'acting' replacement. They readily accepted my request for an hour of their time and confirmed they were pleased to help. My second interview was the first with a Head Teacher at his school and was my first attempt at gathering data for the whole project. The semi-focused style was, I thought,

was well planned and explained. However, two things transpired to reduce the value of the event. Firstly the Head insisted we 'walk and talk' as he wanted to show me his newly opened school. The use of my digital audio recorder was not appropriate. Making notes on the move was not a skill I had practiced. We only had a short final conversation. Even this proved problematic when I discovered my new technology had failed to record. I learnt a lot from this process; from the need to clearly state I wanted an interview to the checking of my recorder. I came across some simple and practical advice about 'technical issues' too late for this first encounter (DiCicco-Bloom & Crabtree, 2006, p.318). It was going to be unlikely that any Head Teacher would be inclined to want to repeat the process. Subsequent interviews proved more productive. I was now much clearer about the required outcomes of our interview. I emailed them the basic structure of the interviews including the initial questions (P3.1) and explained the need to record the conversation for transcription (P3.2-4). This resulted in the interviewees arranging an appropriate private location for the interview and allocating me a suitable amount of time.
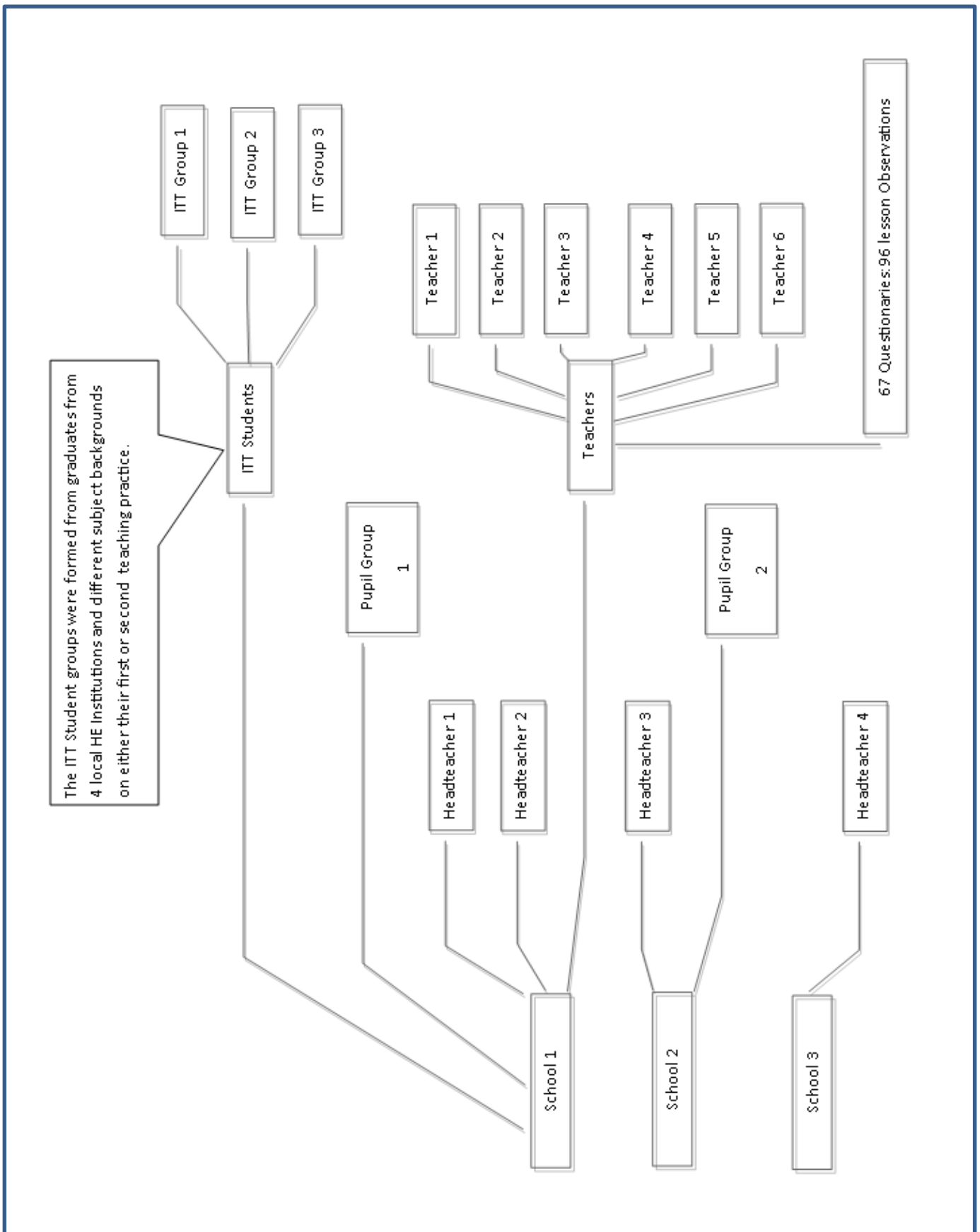
Figure 5: Diagram of Data Sample Relationships

The ITT Student groups were formed from graduates from 4 local HE Institutions and different subject backgrounds on either their first or second teaching practice.

ITT Group 1

ITT Group 2

ITT Group 3

ITT Students

Teacher 1

Teacher 2

Teacher 3

Teacher 4

Teacher 5

Teacher 6

Teachers

67 Questionaries: 96 lesson Observations

Pupil Group 1

Pupil Group 2

Headteacher 1

Headteacher 2

Headteacher 3

Headteacher 4

School 1

School 2

School 3

- 6 teacher interview (P5.3)

As a senior leader in the school, organizing teacher interviews was never going to be difficult. What was to be crucial was the selection of those to be interviewed and the validity of the responses given considering my substantive role and the associated ethical issues. This was probably the data item where 'researching from within' (Floyd & Arthur, 2012) was a potential threat to its validity. As the senior leader with responsibility for ICT at all levels (from the stability of the infra-structure to its role in teaching and learning) I ran the risk of interviewees telling me what they though I wanted to hear. This made it imperative that I made clear the context of the interview and the importance of honest responses that would support school improvement. For this reason the teachers were taken from an established 'Teaching and Learning Group'. All were main scale classroom teachers with full timetable commitments. The group's role was to monitor their own teaching and that of colleagues to seek examples of best practice and share that with the rest of the staff through CPD. They had all been awarded small bursaries to carry out action research projects of their own. Consequently, their focus was on all aspects of teaching and learning and they had an embryonic interest and understanding of research, although this alone could have set them apart as atypical. However, I believe this did help address the power relationship inherent in this context. My interviewees were fellow researchers and empathy became a powerful player as we were mutually aware of our 'moral integrity' in ensuring research data was both valid and reliable (Floyd & Arthur, 2012, p.10).

A pilot teacher interview collected a good set of data and the structure required little alteration for the final set. The test interviewee also tested the questionnaire to check for compatibility.

3.4.2.3 *Focus groups*

The value of focus groups in qualitative research is well recognized (Longhurst, 2010) as they have their flaws, particularly when used on their own; that was not to be the case here.

In advice given to those using Focus Groups in the study of the use of medicines Hardon et al offer the following summary:

> The strengths of FGDs (Focus Group Discussions) are:

• *The method is quick and cheap*

• *A greater pool of expertise is tapped than in individual interviews*

• *The contribution of one person often triggers others to share their views and experiences*

The weaknesses of FGDs are:

• *A skilled mode*rator is required

• *The success of a group discussion is a bit unpredictable*

• *In some cases one or more participants dominate; the views of others are not recorded and so are* under represented

• *The depth of information may be limited. It is hard to probe one person's ideas, as others also have* to be given a chance to speak

• *Analysis of the information gathered is demanding*

(2004, p.30)

For the purposes of this work they were structured in a way compatible with the one-to-one interviews (Morgan, 1996), but providing a way of 'collecting data relatively quickly from a large number of participants' (Wilkinson, 2004, p.180). Both types of groups also had pre-evolved group dynamics. They had met on numerous occasions before, and were used to free flowing discussions and exchange of ideas. Again there are potential flaws in this design. I had obviously not selected a random sample (PSU, 2007), however, their background did also offer benefits; there was little need to allow group dynamics to develop or to allow time to explain the context or concepts involved. The important feature was that they were able to 'consider their own views in the context of the views of others' (Patton, 2001, p.386).

- 2 Pupil focus group interviews, 10 pupils per group (P5.2)

Student voice now plays a key role in both school self-evaluation and Ofsted reports (Jackson, 2004). Schools therefore already have structures in place to garner the opinions of pupils, schools councils being an almost universal element. For the purpose of this work therefore these bodies provided established focus groups. With the many positives of using such groups (established group dynamics, meeting schedules and familiarity with their roles and responsibilities) comes the fact that membership does not represent a true cross section of

the population. While characteristics such as gender are obviously balanced, that of academic ability is not. School Council members are by nature articulate and literate (at least orally) with the self-confidence to act in such a role. They therefore have attainment levels above the average of their peers. This does leave the views of the academically less able largely unrepresented. Certainly a potential flaw here is that even if mixed ability groups had been created the views of those less able to express their views would have been suppressed. The WHO advice accepts this potential flaw:

> *'in some cases one or more participants dominate; the views of others are not recorded and so are* under-represented. The depth of information *may be limited. It is hard to probe one person's ideas as others also have to be given a chance to speak'*. (Hardon et al., 2004, p.30)

Arguably then my approach sacrificed the group being a true representative of the population in order to achieve more complex and richer responses. Such 'purposive' or 'judgmental' samples, once identified, are recognized and accepted as valid (Basit, 2010, p.52).

- 4 ITT groups, of between 3 and 8 students each, from 4 HE institutions (P5.4)

Initial Teacher Training students are postgraduates on one year PGCE courses that include two teaching practices or placements (DfE, n.d.). Students from all four of the HE institutions in the region of this study undertook placements at the same time. Although they formed another group not selected by this researcher they were from a range of subject backgrounds and educational pathways that would have been difficult to assemble in any other way. The make-up of these groups was beyond my control, however it would have been almost impossible to have constructed a better profile, in range of subjects and institutions, from scratch; getting a' bespoke' group together would have been almost impossible. I felt they would offer 'outsider' views and also add to the comments raised by one Head Teacher who was pinning his hopes of transformation on the next generation of teachers. Therefore, although not originally part of the research plan they provided an opportunity too good to let pass.

3.4.3   Questionnaires (P5.5)

To help with triangulation and improve validity (Denscombe, 2007, p.134) a questionnaire was developed with questions that related directly to themes coming from the interview analysis. The pilot study had consisted of a questionnaire (P2), largely to support the development of a CPD programme. The structure of this instrument was used as the basis for development of a new one to be used in this study. There was the opportunity to use an on-line service for the one questionnaire set but this would potentially alienate those who are less ICT literate (Wright, 2005), a group whose views needed to be captured; a printed questionnaires was devised. The questionnaire required more amendments following its first test. The revised version received positive feedback and, having been reviewed by a teacher of English, had its use of punctuation improved. It was issued to all teaching staff in the same institution, an 11-16 secondary school that was the most 'mature' in the BSF programme. There were potentially 70 respondents (the whole teaching staff). In reality 67 were returned; maternity leave and long term absence accounted for the missing 3, giving 96% coverage. Teachers who were interviewed were included in the questionnaire respondents.

In order to describe what ICT use that was taking place in lessons it was identified as 'activities', to indicate a significant shift or change in what the teacher or the pupils were doing. An activities list was compiled to construct the question as a result of the analysis of lesson observations. Teachers could offer very few suggestions other than those on a very predictable list. Most (95%) of the lessons observed were rated good or better using criteria from the Ofsted framework,

3.4.4   Lesson Observations (P5.6)

Although they were included in the original plan, there developed a political backdrop to lesson observations. Teachers' professional associations had collaborated to produce what they called 'action short of strike action' just as this phase of the work was about to begin. As this work developed, 'being observed' became part of the political football of the 'work life balance' agenda.

> 'CLASSROOM OBSERVATION: Classroom observation includes observation during learning walks, pupil tracking/shadowing, departmental and subject reviews, pre-inspection visits, drop-ins, mock inspections and any other initiatives which involve classroom observation'.

'Instruction 1: Members should not participate in any appraisal/performance management process which does not conform to all elements of the NUT/NASUWT Joint Appraisal/Performance Management Checklist and the Joint Classroom Observation Protocol'.

'Instruction 2: Members should not participate in any form of management-led classroom observation in any school which refuses to operate a policy of a limit of a total of three observations for all purposes within a total time of up to three hours per year'.(NUT, 2012)

As a result, my original ideas for observing lessons had to be revised as it was not possible to add extra observations unless individuals volunteered. This would have not provided a valid sample as those who would have offered their lessons for scrutiny would have been more likely to be both supportive of my philosophy and positive in their approach to the use of ICT; they would likely be 'enthusiastic innovators' (Higgins et al., 2007, p.214; Cogill, 2003, p.8). My solution was to utilize observations conducted as part of the normal review cycle through which the quality of teaching and learning was assessed across the school. Crucially it was important to not just observe the ICT use in isolation. It was vital that lessons and teaching and learning were seen as a whole, with the role played by ICT seen as one of many contributing features. This also helped solve the ethical issue of the use of observation outcomes. The primary function of the observation was not altered in any way by this research; the impact of the use of ICT was analysed separately and summarised here without any impact on the individual teacher. The total number of observed lessons (107) is itemized in Figure 6 and sample observation form in P5.6.

To validate my lesson observations I successfully completed the Cambridge Education 5 day 'Effective Classroom Observation' course (Cambridge, 2014) where effective refers to the Ofsted criteria rather than research validity.

Figure 6: Lesson Observation Numbers

Subject Area	Number of Lessons Observed
Art and Design	4
Design Technology	7
English	16
Humanities	14
ICT	6
Mathematics	14
Modern Foreign Languages	10
Performing Arts	7
Physical Education	11
Science	18
Total	107

3.4.5 Validity and Reliability

There are a number of important features of the design and methodology that were key to ensuring validity and reliability. Relying largely on interviews can potentially leave the research conclusions open as unfortunately there is no way of verifying what interviewees tell you is a true reflection of their thoughts and feelings (Denscombe, 2007, p.200). All of the interviews were conducted by the researcher. This ensured consistency and a first line validity check as I was face to face with the respondents, able to pick up all of the verbal and non-verbal associated with such situations. Those interviewed were all capable of giving plausible responses to the questions; their views would be valid. Transcripts were checked for accuracy with the participant, however this simply checked at a surface level accuracy. Interview data was also collected from individuals whose responses could be checked against others from different institutions or professional background (Figure 5). Interview transcripts were repeatedly analysed while listening to the original recording. This was particularly key if the original transcription had not been carried out by myself; errors in transcription were detected and corrected. Themes that emerged were cross checked across all of the interviews to ensure they were representative of the sample as a whole. In order to introduce a 'methodological triangulation' (Denscombe, 2007, p.135) the questionnaire was designed to check some of the themes with a large sample (i.e. all of the teaching staff) from one interview group (Bryman, 2006, p.105). Finally, the results of the lesson observations were used to validate findings from the interviews. Consequently my evidence trail was constructed gradually, with themes being modified and added to as each new piece of evidence was collected in a process of 'analytical induction' and avoiding any threat of 'consensual delusion', when 'everyone agrees that more is happening with outcomes than really is' (Miles & Huberman, 1994, p.261).

The design of this study and the analysis of the data collected do, I would hope address the issues of both validity and reliability in the context of a mixed method study.

3.4.6 Practicalities

Not long into the transcription of the audio recordings of the interviews I sadly lost my 'transcription team' of two NVQ students whose placements came to an end. Left to do it myself I trialed reading back the remaining interviews into 'Dragon Dictate' to achieve a transcription. This technique needed some refinement but

worked well enough to speed up the process. It seemed natural to turn to some form of 'computer-assisted analysis of qualitative data' (CAQDAS) (Silverman, 2009, p.252). Following a training session on the use of 'Nvivo', I decided this would be the tool of choice, as is an increasingly large section of the qualitative research community (Jones, 2007), to support the analysis of interview transcription data (Gibson & Brown, 2009, p.176).

Already having used 'Keypoint' software for the construction and analysis of questionnaires, I continued with it to automatically create and analyse results templates (P5.5). This negated the need to use any third party tool, although some of the graphs were manipulated in Microsoft Excel.

3.4.7 Evolving and Approach to Analysis

Using Miles and Huberman's three concurrent flows of data analysis, i.e. reduction, display and conclusion drawing (1994, p.10) and adding the parameters of this project to it (Figure 6) gives an overview of my timeline.

Figure 7: Data Analysis Flow Model

(Miles & Huberman, 1994)
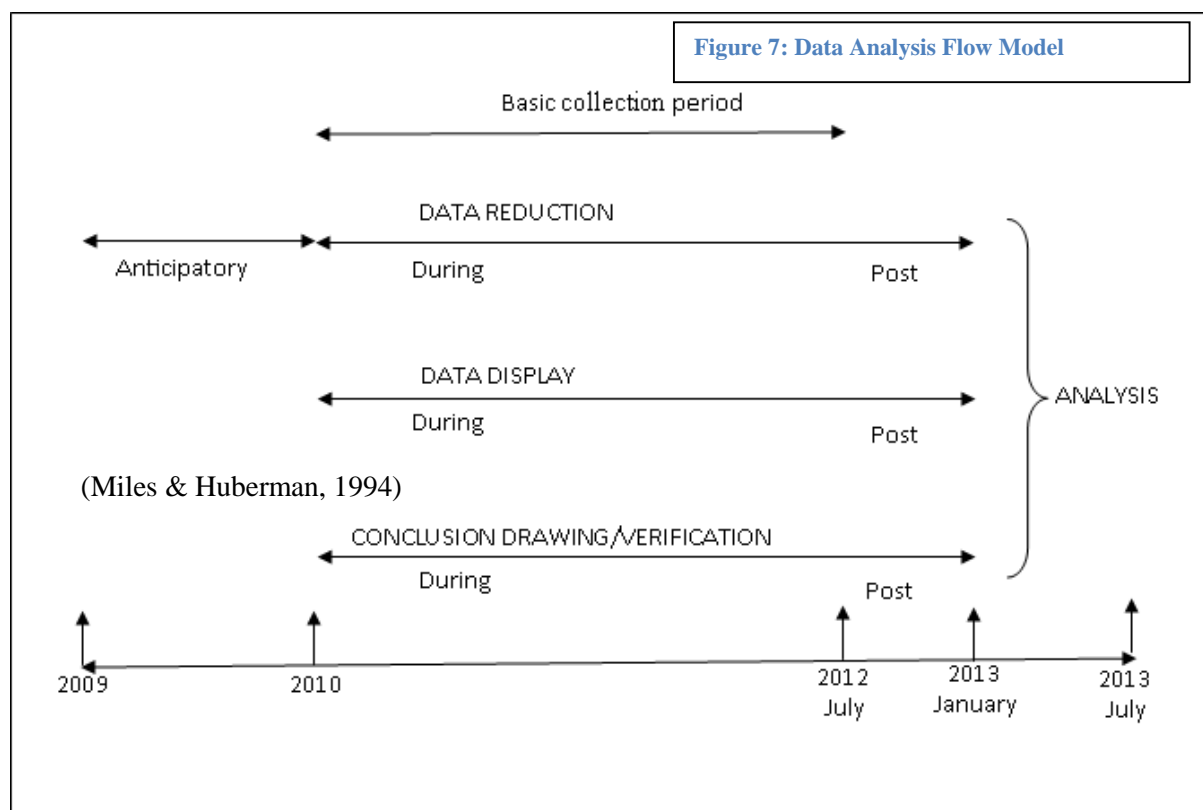
Morse believes that all qualitative analysis, regardless of the specific approach, involves:

- comprehending the phenomenon under study

- synthesising a portrait of the phenomenon that accounts for relations and linkages within its aspects

- theorising about how and why these relations appear as they do, and

- recontextualising, or putting the new knowledge about phenomena and relations back into the context

(Morse, 1994, p.26)

With 16 taped interviews to transcribe and analyse, the 'synthesising' or 'data reduction' stage proved to be the most challenging. This largely involved the coding of the interview transcripts. I was reassured by what appeared to be a consensus among the research community that coding was the only route to take, 'for coding is analysis' (Miles & Huberman, 1994, p.56) or at least 'a crucial aspect of analysis' (Basit, 2010, p.145). New to the process I obviously needed to ensure I embarked well informed.

> Any researcher who wishes to become proficient at doing qualitative analysis must learn to code well and easily. The excellence of the research rests in large part on the excellence of coding (Strauss, 1987, p.27).

Although there was plenty advice to be assimilated (Saldana, 2012), I was still surprised to discover the conflict in the world of research methodology persisted, even at this operational level.

> But the strongest objection to coding as a way to analyse qualitative research interviews is not philosophical but the fact that it does not and cannot work. It is impossible in practice. (Packer, 2011, p.80)

There was a big enough body of evidence (Saldana, 2012) to convince me that coding was the right approach to analyse the data and facilitate interpretation. That is not to say I was hoping to subconsciously move to a quantitative approach. There is a danger that the use of an inflexible approach can lead to 'qualitative positivism' and a 'quasi-statistical analysis style' (Crabtree & Miller, 1992, p.18). Indeed I was determined to keep a strong 'qualitative description' facet to the analysis (Sandelowski, 2000) and resist positivist pressures. How to approach the coding process was the next question. Some themes (e.g. transformation) were pre-determined by the research question; consequently some of the coding template was determined by default.

However, it its accepted logic that coding needs to develop as the analysis continues, particularly if 'coding is a heuristic' (Saldana, 2012, p.8). My approach was to start with some initial codes or a 'start list' (Miles & Huberman, 1994, p.58); that is those that arose from the research design itself and then 'refine and modify' them during the analysis (Crabtree & Miller, 1999, p.167).

I concur with Strauss when he contends that coding:

- Both leads to and follows generative questions.

- Fractures the data, thereby freeing the researcher from description and forcing interpretation to higher levels of abstraction.

- Is the pivotal operation for moving towards the discovery of core categories?

- Progresses towards ultimate integration of the entire analysis.

- Yields the desired conceptual density, i.e. the development of codes and the relationship between them.

(1987, pp.55–56)

Consequently my coding techniques largely followed those outlined by Saldana (2012, p.74); attributes were always coded (Saldana, 2012, p.55). The nature of the data and subjects involving pupil groups in particular meant coding was largely 'In Vivo' or 'literal' (Saldana, 2012, p.74) although I was aware of the risk of over reliance on this strategy limiting future, more detailed analysis. This approach would allow the coding of the data to support and keep the ethnographic and interpretive dimension of the work rather than threaten it. The final coding template therefore evolved over time and coalesced into themes and theories.

Initial coding (Saldana, 2012, p.81) started with 5 basic codes (derived directly from the research title) and plan, another 6 emerged from the 'first cycle' (Saldana, 2012, p.45). This may have been the result of the sequence in which the transcriptions were analysed. The interviews were not conducted (and therefore not analysed) in category order; the subjects became available at different times over the data collection phase that was almost random in sequence. The subsequent impact on analysis can only be guessed at; my feelings are that it was positive. New items added to the code template forced the re-analysis of earlier transcripts; themes started to evolve under which codes could be categorized in an 'iterative and reflective process' (Fereday & Muir-Cochrane, 2008, p.83). Indeed DiCicco-Bloom suggests that analysis and collection should occur

concurrently so that sampling and questioning can be 'informed' (2006, p.317) and that this iterative process should continue until no new codes or themes emerge. The majority of coding categories derived from interviewees' perspectives and beliefs; titles were therefore largely related to their 'values' (Saldana, 2012, p.89) straying into dramaturgical (Saldana, 2012, p.102; Berg & Lune, 2011) territory, specifically when working with data from teachers. Practically, the 6 stage process of data coding described by Fereday (2008, p.84) offers a close fit to the strategy used here (Figure 8).

Figure 8 : Diagrammatic representation of stages to code the data, after Fereday, 2006, p84

Stage 1: Developing the code manual or template

Stage 2: Testing the reliability of the codes

Stage 3: Summarising data and identifying initial themes

Stage 4: Applying template of codes and additional coding

Stage 5: Connecting the codes and identifying themes

Stage 6: Corroborating and legitimating coded themes
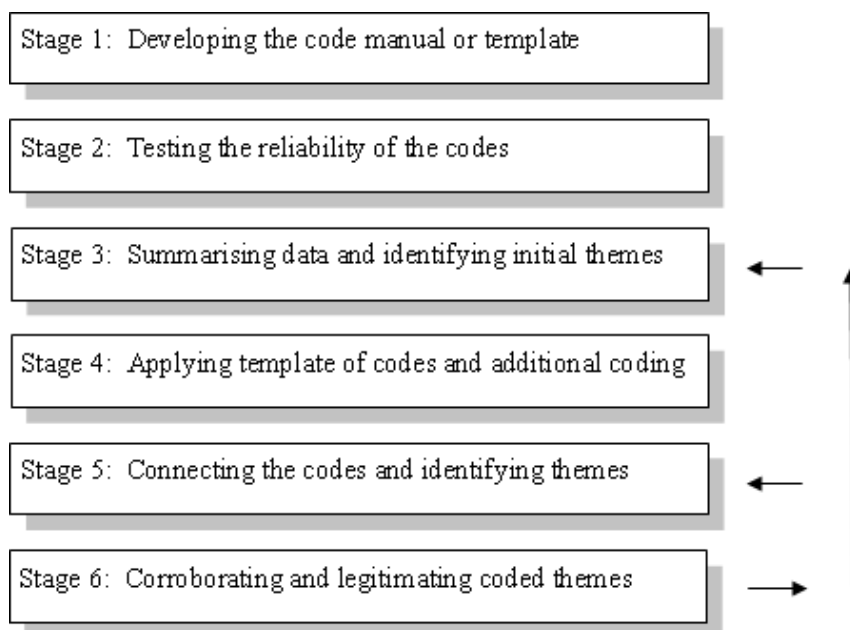
3.4.8   Data Analysis

There is no fixed approach to data analysis, 'Analysis is a very personal act' and 'a rather intimate and exposing process' (Gibson & Brown, 2009, p.193). Data was initially analysed by interviewee group. This approach allowed codes and subsequently themes to evolve. The transcripts were then re-analysed, not in the original category order but from the perspective of these themes to ensure nothing was missed in the original analysis pass. Themes emerged throughout the process; some were merged or became sub themes. To illustrate this, Figure 8 lists the first two coding stages. Themes frequency was cross referenced with the sources in which they were identified (Figure 9); I have presented a discussion resulting from both stages. The 'group' analysis is presented largely to explore their context; the 'theme' analysis attempts to draw together the evidence from the different groups.

Figure 9: First codes from initial analysis

Initial codes
BSF
Transformation
ICT Infrastructure
MSP
CPD

Codes added after first analysis
Positive effects
Negative effects
Teacher confidence
Teaching and learning
Pedagogy
Communication
Future Developments

Figure 9: Theme Frequency

Code	Sources	Frequency
BSF	8	27
Communication	11	43
CPD	9	69
Future development	4	11
ICT Infrastructure	6	19
MSP	7	41
Negative effects	12	85
Pedagogy	4	11
Positive effects	14	168
Teacher confidence	14	74
Teaching and learning	13	121
Transformation	12	27

Figure 10 attempts to show the relationships of codes at a much later stage in the analysis and some of the major themes that started to arise during what was primarily an iterative process. Where possible, questionnaire responses were linked to support validity.
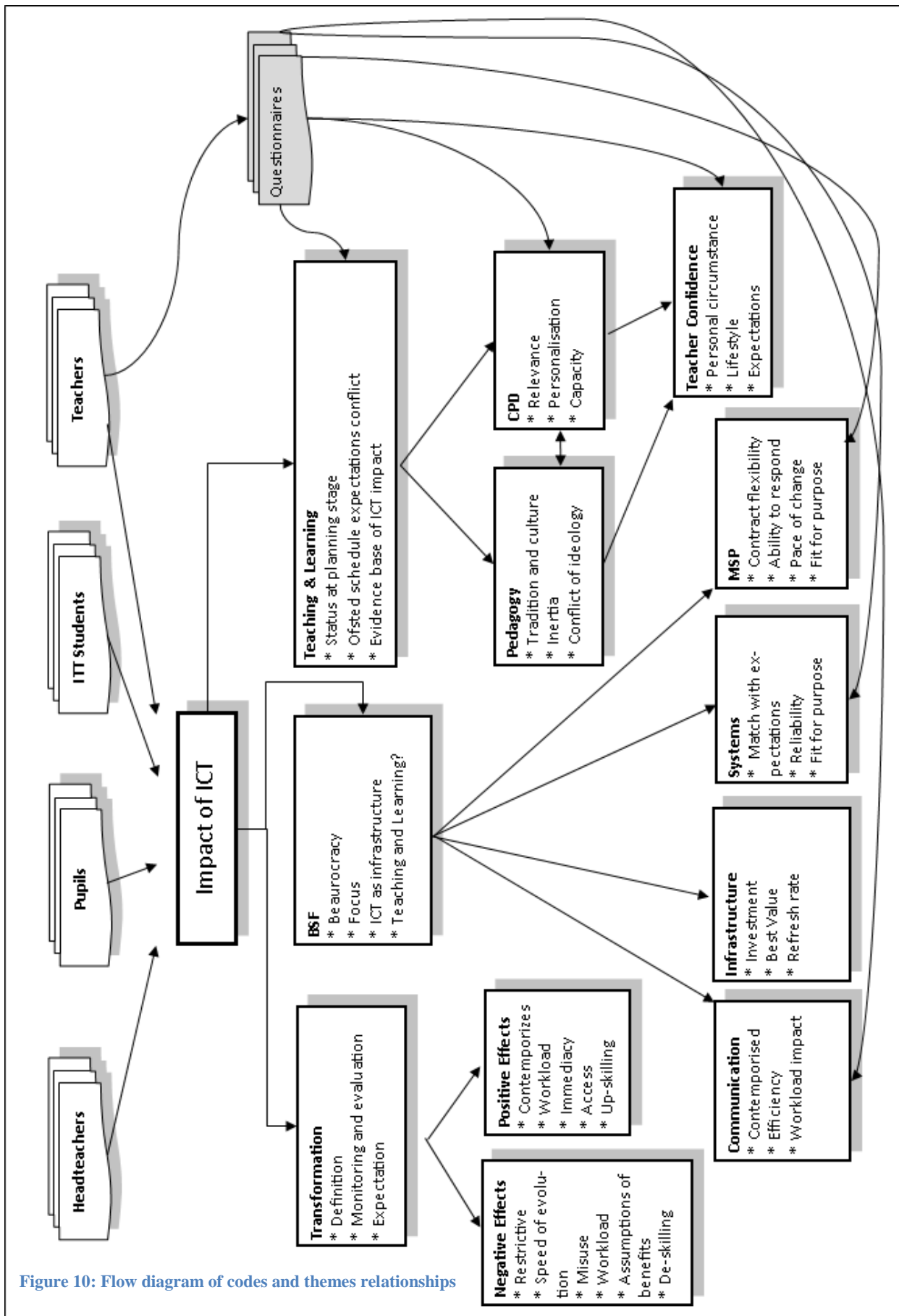
Figure 10: Flow diagram of codes and themes relationships

4 Chapter 4: Research Findings

In this chapter I will explain what the evidence I gathered from Head Teachers, teachers (current and future) and pupils from 3 schools in a 'Wave1' BSF project might indicate about the transformational impact of the ICT component of BSF. I have outlined how I evolved my own methodology for analysis above, and now offer an interpretation of the outcomes of that analysis.

4.1.1 Analysis by Interviewee Category

Deciding to perform an initial analysis by interviewee type was my first approach, as doing this before the theme approach would serve to gather some context for each group and to further develop the themes that could subsequently be analysed in more depth. When quotations from interviewees are used, they are referenced by category (HT, T, Pu or ITT) and numbered so as to distinguish individuals.

4.1.1.1 *Head Teacher Interviews (HT)*

School improvement was (and is) the main focus of Headship. Interviewees were steeped in this process and its complexity. For a number of years they had been involved in a culture where the quality of teaching and learning had become the accepted focus, driven by the school improvement agenda and Ofsted criteria; consequently their observations of teaching and learning were (and still are) summarized against prescribed criteria meaning any classroom activity would have its impact judged against them; significantly, BSF took place in this landscape, an environment of accountability based on headline measure outcomes (largely the % of pupils obtaining 5 good GCSE grades including English and maths) and OFSTED grading. This now existed alongside the expectation of transformation and innovation, all of which they were largely responsible for. Consequently Head Teachers were locked into traditional organizational structures and systems determined by curriculum and exam performance pressures that they perceived to be at odds with BSF expectations of being modern, different and transformational (on page 28 above).

> *'We have a reality of an exam bound system and informative assessment system; often pigeon-holed into subject areas and that's going to take a significant time to change it; if there is a will to change it. We seem to be moving in the opposite direction at the minute'.* (HT1)

This illustrates an awareness of the tensions and conflict generated when trying to be transformational in pedagogy while being measured against traditional outcomes as 'different reforms neutralize each other' (OEDC, 2001, p.105) (see 2.2 above). They were also very aware of other key aspects (curriculum, timetables, class size and examination systems) that were outside their influence, the non-manipulative factors referred to by Afshari et al (2009).

Significantly this group found separating BSF as a whole from the ICT component difficult as they pictured the project as an entity. They were able to discuss their roles as 'rhetoricians and marketeers' as they simultaneously extolled the virtues of BSF to both their internal (teachers and pupils) and external (parents) markets (Hartley, 1999, p.311), while shouldering the burden of responsibility for the practicalities of delivery of their BSF projects in their new found role of project management (Moore et al., 2002). Having written vision statements (P1.1) on the expectation of ICT they were, in reality both realistic and rather sceptical as having taken the BSF millions they were then faced with the task of delivering what BSF was expecting without any ongoing help, guidance or support and in a particularly short timescale.

However, Head Teachers were naturally excited by the prospect of BSF investment. They were able to articulate that enthusiasm in their 'Vision Statements' and accept the fact that ICT would have a role to play.

> '...it (ICT) allows you to transform the learning environment'. (HT1)

In qualifying 'environment' they discussed their attempts to introduce modernity to the physical nature of school buildings and ICT infrastructure, as I believe they saw the potential of ICT to change the way in which teaching and learning was organized, although they never did articulated their ideas in detail and consequently the talk remained at a top strategy level, often with the re-use of the language of their vision statements.

 BSF as a whole was therefore seen as having massive potential as a change agent in helping schools move forward, but without the detail.

> 'I think we felt quite confident within the school that we had the vision, the ideas, and the practical knowledge to begin that fairly long term plan of putting in place a transformational educational provision for young people'. (HT3)

However, they were honest in describing the reality of the actual process as driven by PfS, which focused on bricks, mortar and procurement, leaving them to deal with the teaching and learning revolution.

> 'I think, in essence, the BSF project was a building project and depending on the leadership view in the school, *they either grasped the transformational opportunities or they didn't'*. (HT3)

The concept of transformation was not dismissed; far from it. Consequently they touched on their own definitions, significantly making learning relevant and engaging was a goal they could all articulate.

> 'The idea of transforming teaching and learning is something that you hear a lot about, but what it means really is making the learning experience of young people relevant to them. What we are moving in to is an era where by how we can operate and deliver that'. (HT3)

So, importantly a chance to use the technology to make the curriculum more contemporary and accessible was perhaps shaping a definition of transformation rooted in the experiences of the children.

> '...transformation has got to be in what the children do'. (HT4)

Evidently they wanted their new schools to be different and better, although the detail of how this would look and work in reality remained elusive, a position that reflects the ongoing confusion around transformation. They were able to consider that ICT could play a major role in the future of teaching and learning but understood it was only part of a much bigger picture.

> 'But it is not about ICT per se, it is about how we, as schools and school leaders, and much more importantly teachers in classrooms, use that ICT to transform that learning experience'. (HT3)

In contrast there was also some scepticism about just how much over reliance was being placed on the role of ICT as a transformational tool.

> 'ICT is perhaps being put too much at the forefront of that debate about transforming learning'. (HT4)

They were possibly beginning to identify technology as one of the 'wrong drivers' of change (Fullan, 2006) and sadly, it was impossible to ignore their feeling of disappointment of the reality that emerged after the

visionary rhetoric. Practicalities dawned as the ICT systems they were promised would deliver the platform for transformation simply did not live up to expectations, thus reflecting number 3 of Fullan's 'wrong drivers', 'technology: investing in and assuming that the digital world will carry the day' (2011). Consequently I was left with a feeling that as a group they had been somewhat naïve from the start in believing the faith that had been placed in ICT from the start.

> *'it's not nearly been transformative yet'.* (HT4)

Worse still was the feeling they had of a negative impact of the ICT on running of their schools and the classroom. Poor reliability (systems were regularly 'down' at crucial times, internet connections variable in speed) and functionality (VLEs were inflexible, software packages restrictive) left their staff feeling let down and frustrated. In the days and months after opening it was felt that an opportunity had been missed, consequently they were able to offer little hard evidence of any positive impact of ICT. This was largely due to two factors. Firstly, the poor reliability of the service (See 4.1.2.1 below) had given a false start. Secondly there was the realisation that any real impact would take years to achieve, even when the service eventually did work as expected. They still held on to their vision statements that transformation could and would be achieved but this remained at the level of vision rather than the practical; after all they had written statements of intent, but these were yet to be realized. This was evident when looking at the school furthest into the process (two years ahead of the rest), where the Head was beginning to see the benefit.

> *'increasingly we see* very good practice around using ICT to enhance the teaching and learning experience for pupils in the classroom.....*it is pretty embedded now'.* (HT3)

Interestingly he uses the term 'embedded', suggesting use that has become part of normal practice rather than changing it in any way. This is the school in which the lesson observations took place; the analysis of that data (Figure 20) supports this this assumption.

The fact that the BSF programme became largely a buildings project has been discussed at numerous points in this work. This was confirmed a number of times by Head Teachers.

They all referred to the time and effort put into issues of construction in comparison to teaching and learning, again illustrating the clash of priorities and values between the schools and building contractors, with the imperatives of the latter to deliver on time and budget coming out on top.

As educational professional they had little or no experience in managing large infrastructure projects but were thrust into the position of managing the interface between contractors and teaching and learning, a position for which they were ill prepared. As a result, I believe they succumbed to the pressures of dealing with the practicalities of construction process procurement deadlines (potentially because it is easier to make decisions around the colour of door furniture) rather than the infinitely more complex ones around the nature of the future experiences of their staff and pupils.

> *'The danger is that it all becomes about the building, the walls, the guttering and door handles'.*
> (HT2)

I am not sure if they even challenged PfS about this imbalance in managerial capacity. They all raised as a matter of concern just was how much of their own capacity and that of their schools was soaked up by these business values in comparison to their core business of teaching and learning. Any increased time and expertise being devoted to the educational side of the divide would have to come from existing budgets. Over a three year timescale these cost would be considerable (calculated at upwards of £150,000 in one school) and meant some reduction in the final provision, ironically possibly fewer computers for staff and pupils.

On completion, the new technology environments were not universally welcome. Heads talked fondly about the systems they had prior to BSF, the technical staff they had managed and the control they could exert as previously their schools had been autonomous in all aspects of their ICT use; consequently they lamented their loss of influence.

> *'With BSF we've lost that, it's all distant. The managed service could not do anything as well as he was already doing'.* (HT4)

Again there was unanimity in the feeling that they had more in quantity but had not been matched in functionality or quality of provision. I would also argue their understanding of how to best utilise their

increased provision in teaching and learning was limited at best and that the MSP was no better informed. This observation is supported by data from all the other sources in the discussion to follow.

For all but one of the schools, working with a private provider was a new experience, and not initially a positive one.

> '……managed service. I think that has held us back'. (HT3)

The complex and expensive procurement process had engaged an MSP on a 5 year contract. The reality was that once signed, the contract left little room for negotiation.

> 'BSF forced us to look at a managed service and have to engage with what they were offering rather than what we wanted'. (HT1)

Schools were given little choice but to accept a 'product' misrepresented as a 'service', with a contract that was detailed around what they would get rather than what they could ask for.

In contrasting their vision statements with the reality of what they had received, it was impossible not to feel their disappointment.

> 'I think part of the problem was my expectations were too high'. (HT4)

This is one occasion when a Head Teacher almost began to offer an apology to explain perceived failures in the results of aspects of his BSF projects, he even suggested it should have been no surprise that there was little in the way of expertise on the activities of classrooms coming from within BSF.

> 'I don't think it was BSF's job to tell us about the teaching and learning'. (HT4)

The result of this was schools tried to incorporate CPD around the use of ICT into their regular school improvement work, resourced from their own budget and capacity, (as the capital funding for this sat with the MSP) in the hope that teaching and learning would be enhanced. As such there was a clash of priorities (see 5.5 below) between multiple agendas.

Perhaps more perceptive than PfS, Head Teachers understood that at the heart of any change in teaching and learning was the quality of teaching, an observation that recurs through both literature (McKinsey, 2007) and my data.

> *'...much more importantly teachers in classrooms use that ICT to transform that learning experience'.* (HT3)

Teachers accepted their key role and understood it was up to them to make best use of the technology.

> *'I think it is overused in certain ways but I think it's more about the user than the use'.* (T1)

Head Teacher were clear that in the right hands ICT was capable of being a major player in realising the BSF vision, and that was the most important factor, just like any other tool. Once again, good teachers with the right skills set were seen as essential in any change process (McKinsey, 2007). I believe this is an area of expertise that MSPs had little understanding of; yet they had been allowed to bid for school ICT projects by a government who either assumed they had, or were being driven by, their newly found faith in the private sector's ability to deliver (Selwyn, 2010, p.73).

> *'I think it is capable of helping; you've actually got to have the staff who have got the right skills and the willingness to transform'.* (HT4)

This comment from HT4 is significant as he touches on the complex inter-relationship between teacher confidence, CPD and the conflicts within teacher professional lives. HT1 raised what he referred to as 'possible unintended consequence' of BSF. When talking about teaching staff readiness to embrace their new environment he detailed how many experienced staff, getting close to retirement, brought the decision forward and left, taking with them years of experience. Although the new younger staff who replaced them, he felt, had much better ICT skills and could potentially deliver the change, he worried about the loss of experience that would have been there to support them at the start of their career (Fink, 2003; Rice, 2010) as staff turnover does not come without cost.

> The hidden costs related to the turnover of school staff that takes place every year in many schools can also take toll on effort to sustain and deepen the implementation of any improvement programme. (Hatch, 2000, p.9)

So, as strategists and operational managers Head Teachers did offer a comprehensive view of the big picture and so touched on all of issues that follow in this analysis from BSF planning, building and the engagement of the MSP to the nature of the teaching and learning that took place in their new schools.

4.1.1.2 *Teacher Interviews (T)*

Six teachers were interviewed from one school. All the teaching staff from the same school also filled in the questionnaire. This section sets out to analyse the interviews and reference will be made to questionnaire responses if they are relevant to particular points or comments made.

There was overwhelming acceptance of the indispensable role of ICT in the lives of the interviewees. The questionnaires supported this (Figure 15) in that even those in the later stages of their career, while less enthusiastic about some aspects, reported that they felt ICT allowed them to be more productive (P2.1, Q6&10). Efficiencies had been made in preparation, communication and sharing of resources. Access to a range of commercial and free teaching materials that could be retrieved via networks and used in classrooms was labour saving. The production values, including multi-media content, were of a standard beyond that which could be created by any one individual. However, teachers reported using such resources for 'whole class teaching', giving them not much more than the ability to display colourful and animated teaching resources as compared to their older more static ones. This was perceived as transformational in the early days of the IWB (Brna & Cooper, 2003; Thomas & Schmid, 2010a, p.89) and it certainly featured as a positive change from the perspective of pupils and teachers alike, but I feel it was more of a multimedia enhancement to current practice when I observed lessons. In short it appeared that teachers had no more than a technologically enhanced blackboard to which pupils were asked to 'pay attention' (Brand, 2010), a conclusion supported by my observations. Teachers' assessment of their own practice (Figure 19) and my observations (Figure 20) support this conclusion. Display of all types is at the top of both data items, indicating at the start of lessons at least, a passive role for pupils; one teacher was very aware of this;

*'...well its counter intuitive to teaching isn'*t it. *Its people staring at a screen.'* (T6)

This seems rather dismissive, pupils 'staring at screens' is not how I would have recorded my observations as 'staring' seems a little extreme. There was certainly a lot of material displayed, some of it static that simply required reading but a considerable amount offered stimulus (artists work, results of experiments, literary quotes, video clips) that required comment and discussion. Arguably all of this could have been done without technology, much of it on paper (indeed some staff used both) but I have no doubt that classroom interactions were enhanced; pupils confirmed this (see 4.1.1.4 below).

More than one teacher talked about the 'comfort zone' they had settled into (

Figure 10) while one reflected on the value of digital displays in general. Once they had become familiar and confident with enough of the new ICT systems to meet their needs, they stopped seeking any further development of their skills (Gu & Day, 2007).

Q9. Tick all of the tasks you use ICT for in your teaching %

Something else?
Accessing a school Intranet
Allowing pupils to complete learning…
Using purchased educational resources.
Displaying WWW pages.
Sharing pupil work for peer assesment.
Displaying multimedia resources.
Monitoring pupils as they complete…
Interacting with pupils via handheld…
Displaying lesson objectives.

0   20   40   60   80   100

Figure 10: Questionnaire respondents by teacher use

They could elaborate on how they could move from a passive role for pupils and describe how these displays were being used to facilitate classroom interaction. There was a lot of evidence in the data to support this.

'..... it's really important the students can engage with work visually therefore videos are often shown to students which they interact with'. (T3)

'I use a lot of quizzes and interactive material using the voting pads at least once a week with each class. I use it quite a lot for formative assessments. Other than that, even if I am doing class based activities I would have some pictures or some keys words up on the board, just the colours and *everything'.* (T4)

'...stimulating discussion or stimulating understanding or provoking an emotion or response from them rather than as a tool for them to use as a lot of what they do is hand written'. (T1)

Consequently, there are two almost opposing observations on the impact of the use of multi-media displays; either they stimulate and improve engagement or they pacify and entertain. The reality is I fell they do both, in the hands of the creative teacher the former is more evident (and more frequent), used by those with a lower skill set 'pay attention' and 'edutainment' are the norm.

The ability to offer a range of displays and quickly change between one and the next added the all-important pace much praised by Ofsted that began to produce an almost a convergent evolution in lesson structure and design based around 6 steps:

1. Objectives displayed

2. Lesson stimulus (image, video, text)

3. Tasks(s)

4. Sharing of outcomes

5. Outcomes matched grading/level criteria

6. Return to objectives

Obviously, my observations took place following agreed protocols and grading criteria (P5.6) and this may well have pushed lesson planning into this direction. However, teachers were delivering what they thought were their best lessons, matched against agreed expectations; what I saw was the use of ICT in that context. One significant contribution was the ability to simplify and enhance the process of peer assessment (item 4 above). The new (Ofsted) imperative to show progress in lessons necessitates the ability to illustrate levels or grades of current work and how it can be improved. Written work was displayed via visualisers, art work photographed or scanned and performances videoed subsequently to be displayed and evaluated by the whole class.

> 'I filmed a speaking and listening presentation and was able to show it back to do a self-assessment *and peer assessment as a class'*. (T1)

> *'I use it quite a lot for formative assessments'*. (T4)

Classroom monitoring software, with its prime use having evolved into classroom control (i.e. checking what individuals were doing on their computers and locking them out of specific programmes or internet tools) was, in the right hands, being used creatively to display work in progress and asses it collectively. This use of technology to allow instant formative feedback (Cooper, 2010, p.4) exploring current attainment and the route to the next level or grade (Looney, 2010) hinted at the possibilities of transformation although of what was arguably a very much tried and tested teaching and learning technique. This observation caused me to reflect on the possible need to introduce a 'scale of transformation', ranging from a low level use of technology to modernise existing practice up to the high end of a radical change in strategy and process, an idea I will develop below.

Teachers were only really best placed to offer an end user view and in doing so were ultimately largely content with their new environment and systems. There were however coming to realise that the ICT was largely a 'curate's egg' in that some parts of what was offered were welcome, others less so. As if to reflect my thoughts of a transformation scale, there was more a feeling of modernisation rather than transformation. This is hardly surprising give the recurring themes of entrenched school organisation, assessment regimes and pedagogy.

Indeed, the data collected indicates school organisation and classroom practice were little different in the new schools in comparison to the old ones. This is of course because, although they may have been new or refurbished buildings, management, staff and pupils were simply transferred (or is that transplanted) along with existing systems, structures and pedagogy. As such, apart from assimilating the new environment and making it work within familiar practice there was little pressure or need to change. The Head Teacher's observation of 'embedding' is pertinent here; teachers took the new technology and used it as much as was needed to allow them to continue as before. Some did respond to the catalyst and were able to develop their practise as a result, most resorted to finding their level of competence and settled there.

### 4.1.1.3 *Teacher Questionnaires (P5.5)*

The inclusion of the questionnaires in this largely qualitative work aims to support the validity and reliability

of the study (3.4.5) not least in the analysis of the teacher interviews. Individual question analysis will be used

in sections throughout this report where relevant.

What the responses did show was there had been little staff turnover amongst (72) teachers in the case study

school since the start of BSF, the embryonic study and this work; very few had left. School growth had meant

an increasing roll, largely of NQTs (Newly Qualified Teachers). The staff profile was therefore one of

experience and familiarity with the school (Figure 11 and Figure 12), with a relatively small number of new

staff at the start of their career.

Figure 11: Questionnaire respondents by teaching service
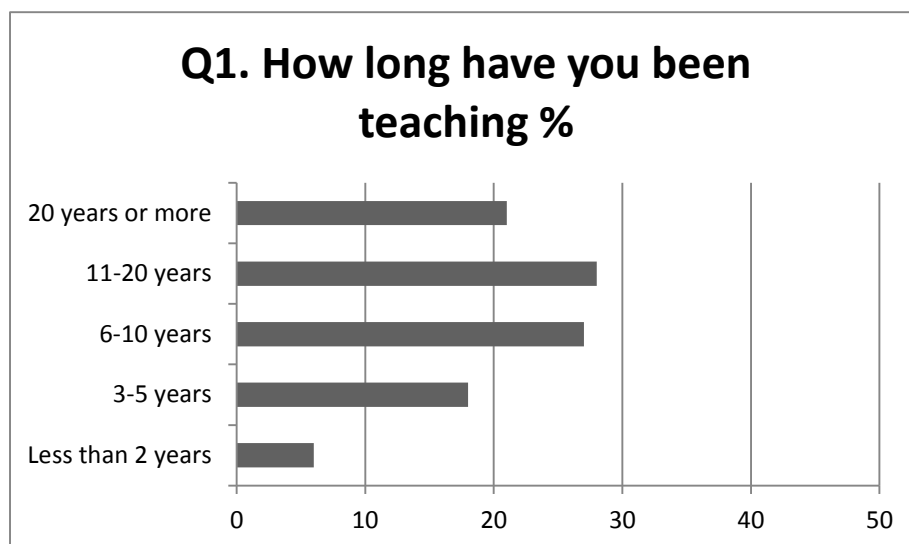
Figure 12: Questionnaire respondents by service in this school
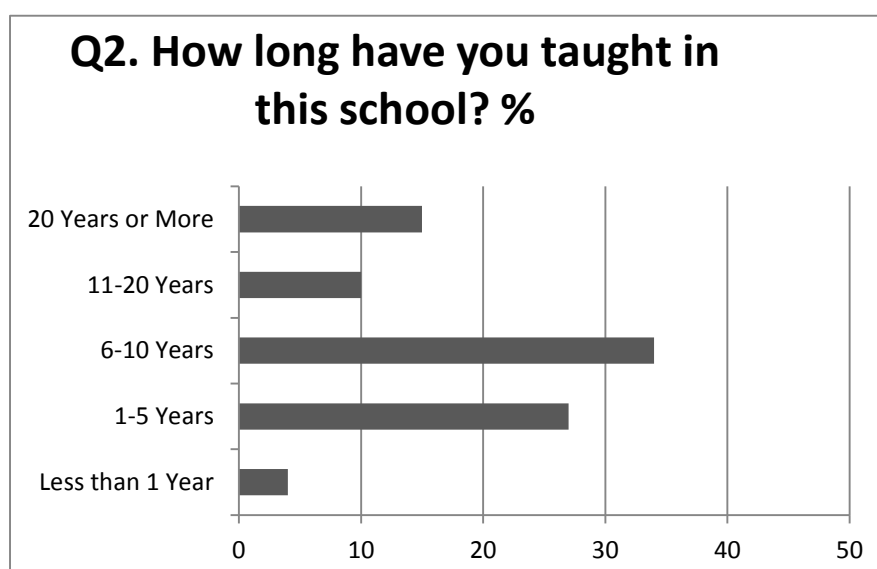
This gave a good opportunity for reflection on the progress teachers had made in using ICT and the potential to ask questions around change. Many respondents and interviewees had 'before and after' experience to draw upon. The 'top line' results from the questionnaire can be found in the portfolio (P5.5).

4.1.1.4 *Pupil Focus Groups (Pu)*

This group provided consistent reference to what they considered were the more positive impact of ICT.

>   Question: Is it making a difference? Answer: *'Yes'*. (In one voice).

They also prove to be very aware of the approach their individual teachers took to ICT use, obviously analyzing and discussing their methods on a regular basis

>   *'(they use ICT)...not a lot, but a little..... It is about their preferred teaching style and what you are doing in the lesson'*. (Pu1)

They were acutely aware of those teachers at the low end of confidence and skill and therefore made little use of the technology;

>   *'Some teachers hardly ever use it. Not very often'*. (Pu6)

The classroom is a stressful and high powered environment and the sources of that stress vary greatly depending upon a multitude of factors (Klassen & Chiu, 2010). Successfully managing that environment is a key to successful learning, though while it that may not be explicit on lesson plans it is a priority for all teachers. Consequently, including an element of a lesson that teachers are not confident with, or even worse may not work, is unlikely to happen as it may lead to that all important control being lost.

>   *'The majority of teachers' first priority is to maintain order in the classroom and to have a controlled learning environment. Any suggestion of adopting very innovative teaching techniques such as using ICT is therefore seen as threatening this orderly pattern and therefore not desirable. There is a genuine fear amongst many teachers about ICT and scepticism of its value to their pupils'*. (Cox et al., 2000)

Pupil P6's observation above (and those of others) fit well with those outline in the literature review (on page 43) What they are seeing is the end result of the effect of 'manipulative factors' (Afshari et al., 2009), 'external pressures' (Cox et al., 2000) and 'lack of time' (Preston, 2004). I have previously commented upon

Becta's research evidence and their acceptance of *'the significance of professional development'* (Scrimshaw, 2004, p.5); the same report notes *'unfavourable school level factors'* (2004, p.4). I suggest that 'classroom level factors' need to be included as it is here that all of the influences and pressures become focused resulting in the classroom experience of both teacher and pupils.

While pupils expressed their frustration they also sympathised with their teachers:

> *'If you think about it, everyone always struggles. If you get something new and you don't know how to use it, you're always going to struggle unless you know ho*w to use it*'*. (Pu2)

They were potentially seeing the outcomes of the training gap felt by their teachers, a phenomenon I have established as not unique to BSF (Day et al., 2008)

> *'I don't know whether teachers get trained but sometimes they can't do something on the computer'*. (Pu2)

Supporting findings detailed as a theme later in this report, they described teachers resorting to their 'comfort zone'; using software that they were reasonably confident with.

> *'*I do think a lot of teachers rely on PowerPoint. I think it is what they feel comfortable and confident with*'*. (Pu5)

This they thought was not always a good use of ICT

> *'...*when you do PowerPoints it is not as beneficial*'*. (Pu2)

They talked about things being 'easier' for teachers and lessons being more 'interactive' (McLoughlin & Oliver, 1995) because of the IWBs. Some talked of more independence when completing tasks and more interaction amongst class members;

> *'....*there is a lot m*ore class participation'*. (Pu2)

At first this observation is at odds with my own when I talk of 'pay attention technology' (on page 21 and 81 above), however, it simply further illustrates lack of clarity around the language used to describe classroom activity. Their description of 'interaction' may not comply with that of those who observe lessons for a living but none the less they did notice a positive difference.

Their final recommendation to their Head Teacher was to improve teacher confidence.

Pupils from the second school had had longer (about 2 years) in an ICT rich environment. This showed in their responses. They talked about a much wider range of subjects and uses of ICT. However, there was still an emphasis on completion of written tasks, internet searching for information and overuse of some software by the same staff, not always to their benefit.

> 'In Maths – *I don't think it helps at all'.* (Pu1)

As another important group of consumers the observations of pupils are, in my opinion never given enough room in educational research findings and it could be argued I have not done a great deal to change that in this work. However, the two groups of pupils provided evidence that almost on its own, encapsulated the whole story of BSF and the impact of the ICT component, even accepting their limited knowledge and experience. Excluded from the planning process (except from an almost patronising involvement in colour schemes and furnishing), they seemed little affected by the implementation and upheaval it caused. The massive increase in the number of devices available had a major impact, the use of online and communication platforms much the same; their frustration at the inadequacies of some of the systems was palpable. Their observations on the range of teacher skills and confidence matched that of the teachers themselves and my observations. Were BSF to have continued, the pupil voice resource would have been one of the first places to go to help inform strategist as they planned the phases of BSF or 'waves' as they were referred to. The changes in the use of technology, the rise of social media, the move to portable personal devices (or even wearable technology) are all shaping the lives of young (and not so young) people (Facer et al., 2003); consequently their views need to be sought. These changes will then need to be reflected in their time in school or its technology may become perceived as increasingly irrelevant.

4.1.1.5 *Initial Teacher Training Students (ITT)*

These groups were not part of the original research plan but were included largely due to the comments of HT2 who placed a lot of hope on the next generation of teachers having the ICT skills to make use of his new teaching environment. Although his initial observation was that this was proving to be the case he also accepted their acquisition of the skills in dealing with current classroom issues were under developed, the very skills his departing experienced staff had. I wondered what the ITT students thought about this. As there was a readily available (and constantly changing) cohort of ITT students on placements in my own school, it seemed appropriate to included them in the data set, therefore 4 cohorts of ITT students were interviewed as groups. This is however the data I am most sceptical about as the respondents had limited experience to call upon and what they did have was very specific to their own context. Significantly, not all ITT students are of an age to be considered 'digital natives' by default. Mature students can be (and were) coming to teaching as a second career. Interestingly, as we only took students on their second placements, they all had at least one other school to make comparisons with.

> 'My last placement did not ha*ve any ICT and this is a huge improvement'*. (ITT1)

Most acknowledged the ICT rich environment of their current placement and few had come across anything better. One frustration was that the variety of ICT installations between schools was presenting a steep learning curve in familiarising themselves with how, for example, different models of IWB worked. More than one was frustrated that materials that they had prepared for model x in their first placement would not work on model y they were now presented with. This is one of the outcome of the open market of ICT provision for schools (on page 38 above).

Detailed planning and preparation, an essential part of teaching practice, was a predominant feature of early parts of the discussions. Lesson objectives and learning tasks were being planned well in advance and, in the case of two students from different universities teaching the same subject, shared. Adapting material provided by existing classroom teachers was saving time and giving confidence. Materials were described as 'up to date', particularly those for pastoral and tutorial sessions.

Variety in the range of Universities was increased when subjects and lecturers were added to the matrix, but the overall response was that much of what they now knew was either self-taught or learned while on placement. This is of course how the ITT placement is supposed to work and the observation is unsurprising when considering how little time they now spend in their base institution at the start of their PGCE courses or ITT is taken into consideration. Interestingly their description of the variety of the skill sets of their lecturers mirrored those of the school pupils and their teachers. There was almost universal experience of those whose methodology was PowerPoint presentation of lecture notes that could have more efficiently been distributed for reading. The experience of higher order skills came largely from Art and Design students. Here, the development of their ability with specific software associated with creative processes was welcomed. However, only one could recall any specific sessions on how to best use ICT in their new profession; again, this is not surprising as they were about to enter schools with a huge range and variety of provision. A couple from one institution recounted how they had booked a classroom with an IWB for themselves; a group of them then held their own self-help session; in doing so moving into the world of sharing good practice seen as a powerful tool in professional development (Mansell, 2011). Even the IT graduates expressed concerns that they were unsure about how to best use the technology available in the learning process. Their focus had been on curriculum and content delivery not on how to use the technology itself in teaching and learning.

> 'ICT can be very interesting but it can also fall flat same as every other subject. We have not been taught the best way to deliver ICT or even use of ICT'. (ITT5)

The overwhelming feeling was that ICT was now indispensable to them as they began their teaching career. They also gave off a feeling of frustration in that they were convinced there was so much more they could do, if they had access to the right training. However, they were experiencing at first hand the huge variety and range of ICT provision in the schools in which they were placed. There is no doubt that as a group they could not envisage working in anything other than comparably ICT rich environments again. They were acutely aware that they were yet to make best use of the provision and frustrated at the lack of some uniformity of systems that would make professional mobility easier although result in the lack of any independence schools' could have in sourcing the best solution for their own institution. The next generation of teachers were experiencing the impact of market forces and individual school autonomy, an environment that can only continue to fragment as manufacturers and providers compete for business, each with a different solution.

4.1.2   Analysis by Theme

I had established some initial themes (Figure 9) for analysis from my original reading and research question. Following the analysis above, these themes were developed and their relationships altered (e.g. 'Positive' and 'Negative' became sub-themes of Impact). I will also add some reflection on my own experience as both a Deputy Head Teacher and the only remaining LEA employee present from the start of the BSF programme, when appropriate.

4.1.2.1   *Building Schools for the Future and Managed Services*

Although a key element in the title of this work, the BSF process was not particularly high on the agenda of many participants, other than school leaders. It was the least frequent item in the coding table, occurring only 27 times in 8 interviews, with only Head Teachers really able to distinguish between the BSF and the ICT service. There was little if any reference to the physical upheaval caused by building renovation or construction (although this was considerable). I did ask about this but those who lived through it appeared to have accepted that was what they had to endure to achieve the outcomes promised. Most of the references were to the physical amount of new technology that had been delivered when referring to tangible outcomes. Teachers and pupils were less inclined to dwell on the early problems of the BSF process. Indeed they quickly got to see the positivity of the investment and the opportunities that their new schools and their ICT rich environment offered, particularly in comparison to the previous provision, Rudd found that in these situations pupils felt increasingly *'proud'* of their new schools (2008, p.28) . As far as they were concerned their technological environment was better measured simply by quantity alone; their physical environment had certainly been transformed. *'There is (sic) more computers'* (Pu7). When asked if the amount of money spent was 'worth it' from their perspective, more than one pupil replied *'definitely'*, teachers (present and future) knew they were now well resourced, with ICT at least, thus removing one of the barriers (Bingimlas, 2009; Jones, 2004) to ICT use, that of availability. Another two of the barriers, reliability and technical support, were however only partially addressed, as pupils talk of things 'not working' and teachers record less than 100% satisfaction (Figure 13 and Figure 14) ;the data from all groups indicated reliability and functionality

issues, particularly at the start of the contract. Fixes were slow to materialize as technical support was stretch or unable to provide solutions as the problems were systemic and beyond their influence.
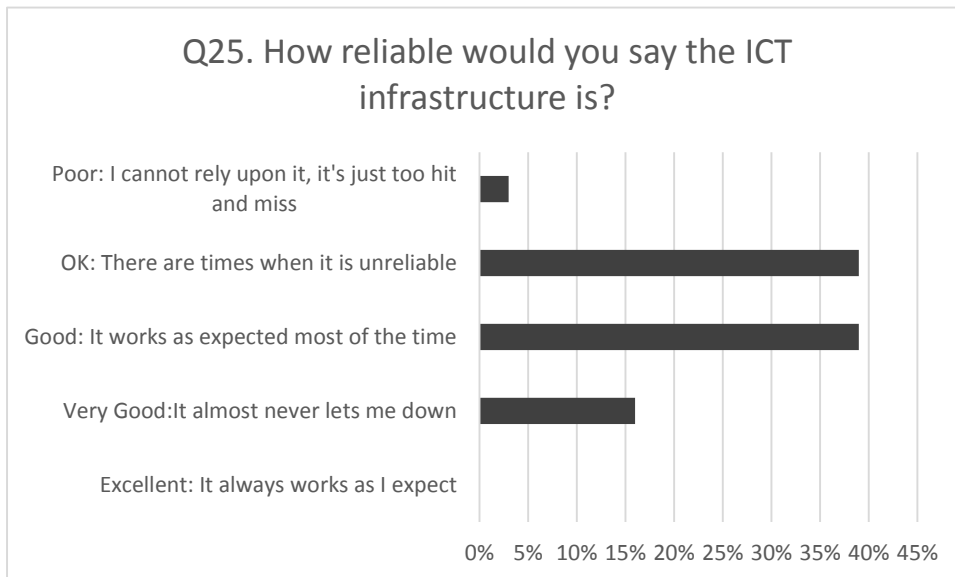
Figure 13: ICT Reliability (Q25)
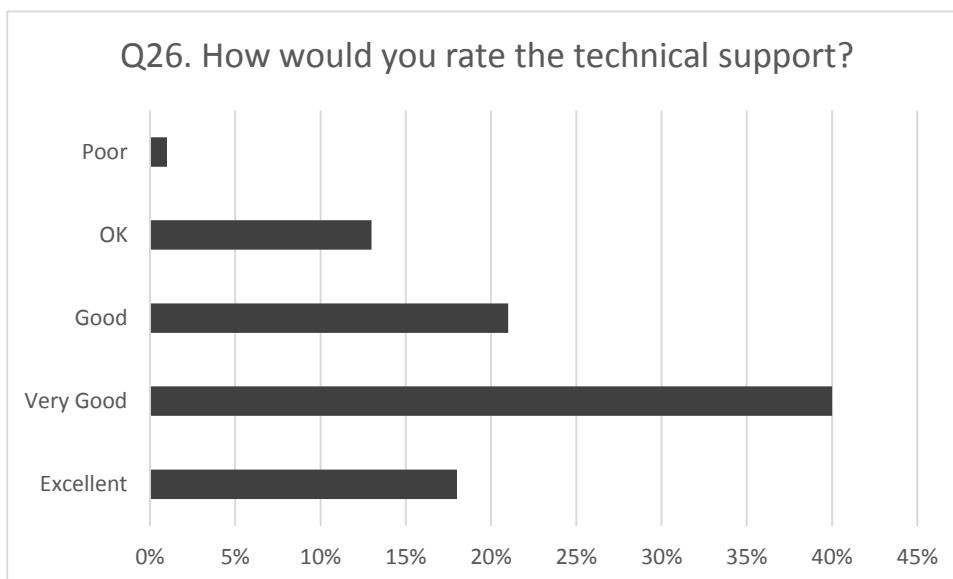
Figure 14: Technical Support (Q26)

Consequently, despite the huge amount of capital investment feelings towards the BSF process, when

expressed, were far from positive. Head Teachers were obviously concerned that the ICT component had

failed to deliver; indeed according to some it may have had a negative impact due to the previously discussed

issues of reliability and suitability. This feeling lasted well into the life of this work and left them sceptical

about future ICT projects (and the associated spending). Perhaps this was a good thing as they became less

likely to believe the evangelistic hype of *'the design, production and sale of digital technology hardware and*

software' that made schools 'wh*olly dependent on commercial interests'* (Selwyn, 2010, p.70), and the

'maintenance of the rate of profit' (Selwyn, 2013, p.126). I know I was then, and remain so to this day as I

continue in my role as Deputy Head Teacher responsible for our ICT strategy post BSF. With the external

pressures of accountability Heads simply wanted ICT to be transparent in the delivery of their schools core

activities and so reduced their expectations accordingly; they were no longer expecting transformation but

instead maintained a sense of reality in their expectations of BSF. They could articulate their acceptance of

their important role as education professionals and distinguish this from that of builders and suppliers.

> *'*Their job was to provide us with ICT that could then be used flexibly to do what we want to do.
> (HT4)

My own experience was that project meetings were very practically focused around building design issues and

costs. Furniture, flooring and paint colour discussions consumed hours of time, always with one eye on

budget. Significantly, ICT meetings were around device choice with decisions made on value and availability,

by groups with educational professionals noticeable for their absence (Cooper, 2010). At the pivotal points

when spending decisions were being made, the crucial moment when BSF funding became tangible, reference

to the principles of teaching and learning and the evidence of ICT impact were not allowed to complicate the

need to procure work and goods on time and at the best price from what was on offer from a limited range of

suppliers (Selwyn, 2010).

Although this work has teaching and learning as its prime focus, it cannot ignore the influence the largely

Public Private Partnership relationship schools had with their MSP. The concept of a Managed Service for

ICT was new to all of the schools involved. This was potentially where the interface between the worlds of

business and education would be tested and a clash of cultures exposed. As with BSF, the MSP was

infrequently referred to during interviews; in fact for many respondents they perceived them as one and the

same. However, when it was talked about the tone was again almost exclusively negative. The legal and

contractual frameworks that set up this interface are beyond the remit of this work but the outcomes have a

huge bearing on the transformation agenda and as such are reflected on in section 5.2 below. The contract

with the MSP was, based on my own experience, heavily weighted in their favour and allowed schools little

room to challenge or modify the service. At a very basic level the MSP failed to understand both the nature of

the curriculum and the systemic organization of schools; or as one Head Teacher put it;

> *'They're very nice people and they know their ICT and we want to do a good job but essentially it* doesn't matter to them in the way that it matters to us and we w*ant something we've got a timetable* for it that has a logic but if you're not in school you don't understand the logic but it is very powerful *if you are in school. They are detached from that'.* (HT4)

He continued;

> *'Yes I don't think they told us lies but* they persuaded themselves that they could deliver more than they were actually able to deliver and when it came to it they just could not cope. They never understood what the real needs of schools are. I was there during the process when we picked the comp*any and got it totally wrong'.* (HT4)

This was not an isolated view.

> *'Incredibly. I think the issue basically is our needs are not their* (the MSP) needs and they don't *understand the pressures or the priorities'.* (HT3)

This further illustrates how naïve Head Teachers were in a world of contracts with business of this type and

scale and so they made decisions that were ill informed, regardless of how many consultants attended

meetings (and there were a lot).

One teacher was quite clear things had gone backwards;

> *'So for music pre BSF we were actually further ahead than we are now'.* (T6)

This echoes the comments in the published work referred to in the literature review (See 2.2 above).

Frustration also emerged around the simplistic and naive firewall and web filtering protocols that prevented

everyday research and delivery activities in a number of curriculum areas.

> 'If you do a random search, but trying to find information for a lesson and you find the page has been completely blocked because there might be one website that is inappropriate. I think it would be better *if you can't get on that website since it is not letting you find any of the websites'*. (Pu3)

PSHE (Personal, Social & Health Education) lesson on sexual health and relationships were completely 'blocked'; pupils in curriculum areas such as Business Studies and Travel and Tourism were unable to complete basic course work tasks if information on the likes of airline tickets, hotel bookings or banking services were involved. Each issue took a series of 'change requests' to resolve.

> *'It's quite annoying when you're trying to research* – and the website is blocked. I understand some *things should be blocked but there's some that it's quite unreasonable'*. (Pu1)

Pupils consistently used their personal use of technology as a comparison (Kent & Facer, 2004). The flexibility and control their private use offered and they expected was not a feature of their new school systems. User management and associated computer profiles were so complex that 'logging on' to networks took so long that frustrations built, particularly with learners who constantly moved location.

> 'It just slows it down. If it takes ten minutes to log on, it is ten minutes of the lesson lost'. (Pu4)
> 'The networks are really, really slow'. (Pu5)

I believe the MSP had put their own interests first to the detriment of the service making it almost, initially at least, not fit for purpose. The excessive web filtering prevented the MSP having to explain pupils gaining access to unsuitable material, it was simply easier to block almost everything as they seemed frightened of consequences if they did not. In order to manage roaming profiles for users but keep their staffing requirements low (as low as one technician per school site) they introduced network and user management software to manage profiles that depleted server and computer resources on start-up, hence the 'logging on' problems. Although this issue resulted in repeated failure of KPIs (Key Performance Indicators), the penalties imposed were so low (as little as £20 per month per sited) that it was not a financial imperative for them to find a fix. Issues such as this bring into focus the inherent problems in the MSP model when the answers to the conflict between financial pressures and the provision of a service lies with the provider and not the customer.

Consequently, regardless of what was understood as the transformation agenda (on page 8 above), it was under threat from the start. The promise that the Managed Services would provide ICT systems as reliable as 'the fifth utility' (after electricity, gas, water and telephony) was only true in the sense that it would be 'on' during working hours. Any part of the contract relating to transformation of teaching and learning was broken as the MSPs were unable to deliver, initially at least, either the true reliability or functionality essential for schools to deliver some basic functions let alone transformational services. My own feeling is a mixture of factors came together to result in some clear systemic failures. The pressure to build bespoke platforms resulted in over-complex solutions and so systems, when applied, were unsuitable for schools. Even with the considerable amounts of money available the MSP could not build the capacity in the time available to deliver any more than basic solutions based around products they already had, that ticked contractual boxes but did not deliver the true spirit of what was really promised to schools. Over reaching themselves at the bidding stage became evident on delivery.

Therefore, because of this, risks were taken with teaching and learning. Not only were schools expected to continue with their core business during their BSF builds, they were expected to be different as a consequence of the disruption while still delivering outcomes that had not changed. Employing an MSP seems not to have been the solution it was expected to be (Goss, 2001). More than one individual from every interviewee category commented upon the mismatch between their expectations and the service as provided, they reminded me of the quote from the author of 'The Hitchhikers Guide to the Galaxy', Douglas Adams 'Technology is a word that describes som*ething that doesn't work yet'*.

4.1.2.2 *Teacher Confidence and CPD*

This a theme that runs throughout this work, every interview group provided data that reflected on the confidence of teachers and how CPD could have an impact. The teachers in the survey group were from a range of backgrounds and experience (Figure 11). None rejected ICT use as part of their daily lives; far from it. Online shopping, email and smartphones are fundamental to the lives of most (Figure 15). This would tend to indicate that they would be open minded about the use of technology in their professional lives. Some could not be considered as 'digital natives' but only 15% of the questionnaire respondents consider themselves technophobes. While all bar one (T6) of those interviewed would not have called themselves technology

experts, all were able to talk about ICT use with confidence. As such they had largely accepted, and in most cases, welcomed the presence of ICT in their professional lives.

> *'I wouldn't say I was in with all the "techies" but I do use it every day. From my iPhone to keep in touch with people but as a work point of view I find it invaluable, I use it every day'.* (T4)

Many went as far as to say it was indispensable and totally integrated into their planning and teaching with only 5% reporting they have not adopted the new technology to any great extent. (Figure 16). All of the data sets provided clear evidence of this, there were 168 references to the positive impact of ICT. Head Teachers,

> *'ICT is part of everyday teaching and learning in the school now. Again, it would be an honest response to say that the use of it is variable but increasingly we see very good practice around using ICT to enhance the teaching and learning experience for pupils in the classroom'* (HT2)

and teachers alike report the pervasive positive use of ICT,

> *'I would say every lesson I would use ICT that had an impact on that lesson or a part of it'* (T1)

> *'I think it's great just to have it there and for the flow of my lessons.* (T3)

> DH. *'If you took IT away lessons would be very different wouldn't they'*?

> T4. *'Yes, not anywhere near the same standard'.*

Figure 15: Teacher Personal ICT use (Q7)
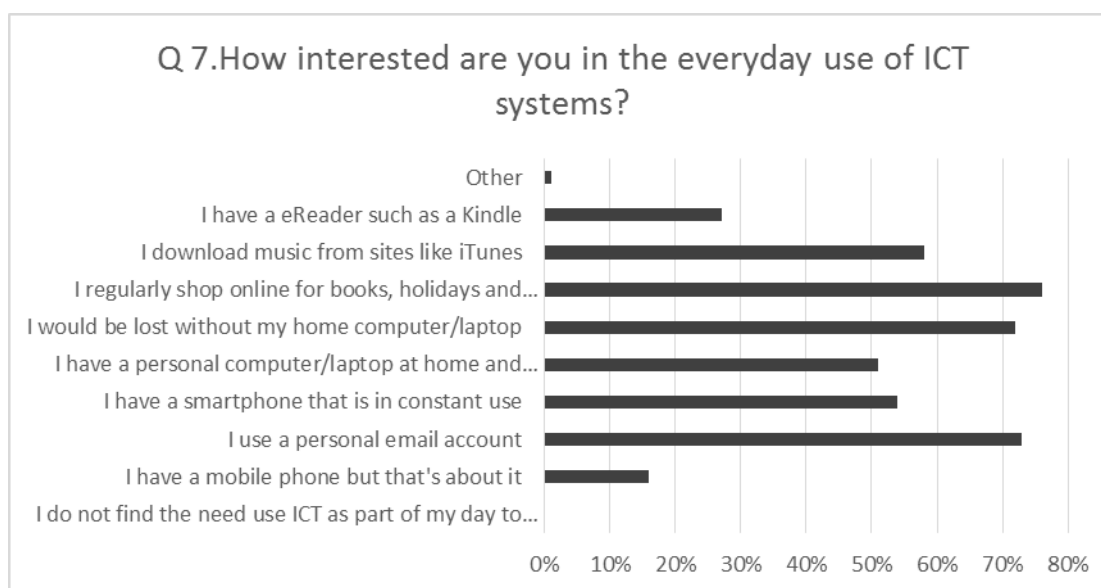
Figure 16: Teacher self-evaluation of classroom ICT use (Q8)

Q8. Self-evaluation of ICT Use	Frequency	Percentage
I accept I have to use ICT. I use it for what is expected of me. I have no real interest in it as my focus is elsewhere.	1	1%
I have some interest in the use of ICT. I try to use it if I can although I do not use it as much as I possibly could.	11	16%
I try to embrace the use of ICT in my teaching if I can. I embrace whole school policy and department initiatives.	30	45%
I use ICT as much as possible in my teaching. I have engaged with CPD and can see the benefits of improving my own skills.	28	42%
I regularly prepare material using ICT for my own teaching and that of others. I consider myself an active user of ICT and have supported others.	26	39%
Other	3	4%

However there was still a perceived skills gap. This was openly commented on by pupils.

> 'I think some of them (teachers) *struggle. If things go wrong and they don't know what to do, they* have to get someone'. (Pu7)

What 'things' they mean are unclear as system failure in the early days was beyond their control, however my own observations were that many staff needed help with hardware and software use when systems were stable. Pupils were supportive rather than critical;

> 'I think it would be kind of embarrassing for some teachers though. Especially the older ones, the ones that have been teaching longer because it is their thing and if they have students correcting them all the time, it could knock their confidence'. (Pu5)

The inclusion of age as a factor by a pupil here is obviously subjective but did have some research backing

(Cox et al., 2000; Afshari et al., 2009, p.80), although it is more the result of a decade or more of poor CPD

that they were observing (see 2.5 above) (Williams et al., 2000). Pupils even offered suggestions on how CPD could be managed;

> *'I don't know whether this is possible but I think that teachers should do different sections and* everybody should get taught just how to do it*'.* (Pu6)

What 'it' is was not explored, however I feel that pupils had identified generic skills gaps that data from teachers confirms exists.

Teachers were also very honest about their own expertise. Even those that I would (subjectively) have considered confident admitted that it was easier to 'stay *within my comfort zone'* (T3), '*I don't use i*t as I am *not confident with it'* (T5) and another confesses *'it* worries me sometimes that the children seem to know a lot more than I do*'* (T4). These three quotes serve to illustrate the conflicts created by the pressures on teachers on a daily basis and ultimately squeeze out any capacity for them to develop their use of ICT (or any other skill). However, as schools settle into their new environments and the ICT service became more stable it looked, particularly from a leadership perspective that the technology was being used effectively; *'teachers are skilled up to use the ICT now'* (HT2). This was again rather naïve, as a closer look would have observed that in fact there had been more than assimilation into normal practice with little real change.

Importantly, the type of professional development training teachers need is very specific to the individual resulting a low satisfaction rating of the provision provided by the MSP (Figure 17), what was offered was generic, inflexible and unresponsive to need.

Q20. CPD; have you…….	Frequency	Percentage
…..had enough to give you the skills to be able to work with ICT?	17	25%
…..had enough to give you basic skills but feel like you need more?	36	54%
….only had the basics and could really do with more specific CPD?	7	10%
…..not had nearly enough and feel de-skilled at times?	5	7%
Other	4	6%

Figure 17: Teacher perceptions about amount of CPD (Q20)

This is hardly surprising considering the type and structure of CPD offered. I have been charged with delivering many CPD sessions over the last 20 years. My experience has led me to believe any attempt at collective or group in-service training (INSET) can only be deemed appropriate when simple 'how too' tasks are being covered. Due to time constraints recipients, (as teachers become in this context) have to follow a set path or plan designed to meet group rather than individual needs. Any deviation into 'one to one' help frustrates others within groups, slowing progress for all that leads to dissatisfaction and disengagement. In a profession crowded with multiple pressures (Sammons et al., 2007, p.699), there is little time left for 'follow-up' or 'extension' activities that ironically teachers would offer their own pupils as a matter of course. Frustrations were easy to understand;

> *I do take issue with the ICT CPD. In lessons you differentiate stuff so you've got your very able kids pushed, your weaker kids etc. but there's just a level. I know there's plenty of reasons for it but I go in* and I know it all and I think well maybe you could teach me something new but I have yet go in and *felt oh wow I've really learnt something . The pace is set at the slowest person in the room which* when it comes to IT skills in the school then variation is massive. (T6)

and;

> *'You want to be taught stuff that you don't know. You don't want to sit for an hour being taught stuff that you know or being given a task that's explained in such a way that it'll take you 5 minutes but* will take somebody else 50 minutes but *you've got to sit through the 50 minutes'*. (T6)

These sentiments were common amongst teachers;

'I have had CPD around using ICT but to be honest it's mainly focused on stuff that I am already quite confident with.*'* (T5)

This all supports my observation of the flawed CPD model offered by BSF contracts; the one size model was

an inappropriate fit for almost everyone, no matter at which end of the skills continuum they found themselves

and had little hope of meeting the training needs of a teacher population of the size that each project included

(70+ per school) even before the timescale was factored in. Both frustrating and restrictive was the fact that

the funding ring fenced for CPD was held and managed by the newly appointed MSP, a commercial enterprise

with little or no real experience of classroom dynamics. Schools had to source their training from the Provider

without access to capital funds for basics such as supply cover to release staff. This resulted in a lack of

flexibility around training programmes and what was offered was largely determined by the MSP and centred

on how to use their systems, be it the MIS or Learning Platform. Obviously these platforms could have an

impact on teaching and learning but higher order use was largely left to the schools or individual teachers to

investigate and develop. Consequently schools started to run their own CPD, based on models of 'sharing

good practice', competing for time and resources from within training programs already pressured with every

other agenda schools had to address (Day & Gu, 2007).

'The most crucial element wasn't ICT, it was CPD. Continuing the focus on CPD, has to be the most important factor in transforming*'*. (HT3)

Unfortunately then the CPD model supported by BSF was flawed to such an extent that the considerable sums

allocated and held by the MSP to deliver it were completely wasted. So little notice appears to have been

taken by PFS of the research evidence (on page 43) on effective teacher professional development as they

structured BSF that school leaders were given a model that they would never have embarked upon if they had

been consulted.

Rogers observes *'individuals pass from the first knowledge of innovation, to the formation of an attitude*

towards innovation, to a decision to adopt or reject, to implementation and use of the new idea and finally to

the confirmation of this decision*'* (2003, p.20), this takes time, and happens at a rate that is very personalised;

the potential to 'reject' is also significant if 'attitude' formed is a negative one. The CPD model took no

account of this.

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4.1.2.3 *Impact on Teaching and Learning and Pedagogy*

If ICT were to have an impact then it would be in the classroom where it would be felt. There were by far and away more references to the positive impacts of the ICT investment practice than any other theme (Figure 10). This is probably not surprising considering the scale of investment. Those in the classroom considered themselves 'very lucky' (T3). Head Teachers were keen to talk about 'potential' and 'opportunities' but were less clear about actual impact. Pupils were much more emphatic; to the question 'has the ICT made a positive impact' there was an unqualified 'yes' from one group and a 'definitely' from the other. This positivity was largely around internet use and the independence that their own network storage gave them to work on coursework and text based task without the need for paper and physical files.

> 'I think it lets you be more independent with your work'. (Pu4)

The innovation of access from home gave them the feeling of being independent learners which, however defined, one would hope was a feature of any educational development fit for the future.

> 'In a world characterised by the knowledge explosion, globalisation and the crucial need for people to be lifelong learners, the development of the ability to learn independently may be seen as essential to the future of education, economy and society.' (Meyer et al., 2008, p.28)

One Head Teacher said he felt pupils were 'empowered'. The feeling of the learner being more in control was clear; revisiting, reviewing and independent research were seen by pupils as being greatly enhanced.

> 'You can learn at your own pace. You can re-read it, go through it. Rather than a teacher – you learn *at their pace. If you're doing it on the computer, it's mo*re about you'. (Pu7)

Perceptively pupils were also able to talk about lesson pace.

> '....instead of getting out bits of paper, it is already there for them *(the teacher)'*. (Pu6)

> 'I think lessons are a lot more efficient, the way they go quicker'. (Pu2)

The issue of lesson pace was seen as a major positive outcome of the new teaching environment

> 'I think it's great just to have it there and for the flow of my lesson'. (T3)

In some respects these observations are contradictory. The ideas that teachers drive lesson pace on the one

hand while pupils have more independence on the other would appear to be a different ends of a continuum.

The resolution of this conflict lies in the context of tasks set for pupils either during lessons or for extension or

homework. Pupils found the technology enabling; software with which to produce their own work supported

by the internet and local online resources for them felt very liberating. For teachers, the impact on lesson pace

was the outcome of a number of drivers coming together. Significantly they found planning more efficient and

were able to build complex lessons away from the classroom; lesson that could make use of a wide variety of

resources and media. They could also share these in their entirety or as component parts. These lessons could

then be delivered without any preparation on the day and used repeatedly with different classes or modified to

suite classes of different ability or age.

> *'Apart from having all of the resources ready, the fact that I can switch between lessons, all I need to do is click onto different folders in my area. There you are straight away, ready for the next class'.* (T4)

The BSF investment meant that every teaching space was identically equipped to enable delivery. Reliability

was, if not perfect better than it had been, with technical support on demand should any issues arise.

An increase in 'participation' and 'interaction' by learners was noted from both sides of the desk.

> *'....and there is a lot more class participation because you can actually see what is going on'.* (Pu6)

> *'..... means it increases the interaction because it means you have everything ready to display and you are using it as a tool for the lesson, so the focus is less on looking at material and more about discussing'.* (ITT5)

Whole school platforms certainly transformed communication. This was the one area that had universally

positive responses; although as more than one teacher pointed out, being able to be reached '24/7' did have its

drawbacks. Not all teachers were comfortable with their established forms of interaction becoming of almost

'social media' design, with established boundaries of time and place removed.

> *'I don't know what we did before it. I think it's much easier to communicate with colleagues'.* (T3)

Email and 'blogs' allowed for all groups to keep in constant touch at multiple levels from 'one to one' and

group discussion. Secure email accounts did, for the first time allow pupils to contact their teachers without

physically finding them in busy institutions, although potentially removing that all important 'face to face'

contact (Cooper, 2010).

> *'During the holidays, if we have homework and we want it marked, we send it by email and my English teacher will send it back marked'.* (Pu8)

Unfortunately a lack of guidelines and protocols around the use of systems like email resulted in their

potential impact being diluted, either because of the 'blanket' email or the offloading of accountability.

> *There's been quite I lot I think with communicatio*n with colleagues of people using it as an accountability measure- *I've sent an email , there's a record as if it's some sort of legal document. For colleagues, colleagues aren't using it right.* (T6)

Certainly the lives of teachers and pupils alike were different in many ways. The difficulty is to decide

whether this change was truly transformational or simply a modernization of existing practice. One clear

positive was most groups felt that the ICT infrastructure had revolutionized communication in bringing

schools and all stakeholders together into a connected world. Contact between school and home, teacher and

pupil, and indeed all other combination was one area that was described as transformed. It was certainly more

contemporary than before with less reliance on paper and post (HT1). A DfE review of the research evidence

in 2010 supports this observation.

> *'ICT can contribute to improved parental engagement by providing a convenient means for parents to* access up-to-*date information about their child's* learning. ICT enables parents to be more engaged *with their child's learning, and supports more flexible working arrangements for staff'*. (Goodall & Vorhaus, 2010, p.6)

Figure 18: Do you communicate with your pupils? (Q16)

Q16.Communication	Frequency	Percentage
I do not communicate with pupils using technology	19	28%
By email	48	72%
Through the VLE	4	6%
I have set up a Blog	4	6%
Other	4	6%

However, seeing past the shiny new hardware was not difficult for some. Interviewees from all groups thought the ICT was not the transformational tool it was expected to be and some actually thought it had a negative effect. There was the potential that the new multimedia lesson material lacked substance as the focus in its preparation was more about the material itself and not the teaching and learning expected. The spectre of 'edutainment' was, in their eyes, very much evident (Buckingham & Scanlon, 2005) and its value was untested (Okan, 2003, p.263).

> *'...thinks less about the quality of what they are putting up whereas if they were having to do with paper-based they might actually put more effort into thinking about exactly that children are going to be doing'.* (HT3)

Q9. Tasks	Frequency	Percentage
Displaying lesson objectives.	55	82%
Interacting with pupils via handheld devices.	13	19%
Monitoring pupils as they complete tasks (e.g. using RM tutor).	39	58%
Displaying multimedia resources (video, audio etc.) to stimulate learning.	61	91%
Sharing pupil work for peer assessment.	43	64%
Displaying WWW pages.	50	75%
Using purchased educational resources.	37	55%
Allowing pupils to complete learning tasks.	41	61%
Accessing a school Intranet	51	76%
Accessing resources on a Learning Platform	33	49%
Something else?	6	9%
Other	8	12%

Figure 19: ICT tasks used in teaching (Q9)

Three pupils commented that they regularly noticed the ICT was *'just there for the sake of it'*. The ubiquitous availability of hardware meant it became the 'fail safe'. A senior leader at a school I worked with on a CPD session referred to this as concept as 'the new colouring in'.

> *'I think sometimes, because they've fallen back on the computers when they've been short of ideas for lessons and it's just been boring no-one's really learnt anything. They put a few pictures on a* PowerPoint *and messed about with it really'.* (Pu8)

Heap makes a similar observation when he observes, *'Students know when technology without purpose is* being *"forced upon them" for the sake of "keeping up" rather than for actually improving learning'* (in Purcell et al., 2013, p.49).

A change in pedagogy, if recognized would be where transformation should be most readily identified; ICT being used to shift the structure and methods of teaching and learning from its largely Victorian organization still prevalent in English school (Mäkitalo-Siegl et al., 2010, p.1). There was certainly evidence of this, some of it already covered, however results from questions about the tasks that teachers undertook using ICT are largely digital versions of those previously undertaken with tradition materials and resources (i.e. paper, pen, books and blackboard). 'Display' feature heavily, albeit that which is very media rich. Using materials from a range of sources is also clearly evident, be they from a local server or the internet (Figure 19).

The activities seen in lessons were ranked by regularity of use (popularity), significantly the use of ICT was largely instrumental in giving lessons pace and structure while disseminating information. Consequently what evolved was what I refer to as a move to the 'comfort zone' where teachers expended considerable effort in getting to know their abilities and find their limitation and on reaching the point at which they were able to function they simply fixed their level of competence and stayed there (Figure 17) not moving into their ZPD (page 39) largely I believe because of the impact of other pressures (accountability, curriculum, assessment methodology, time) and CPD priorities that were misplaced, and the lack of expert assistance in real time.

> The only thing mine uses his computer for is to log on, mark the register and logs off straight away. (Pu2)

Possibly the obvious choice for lesson content display software, (such as PowerPoint) became the platform that launched the majority of lessons (Figure 19). Not that this was always a bad thing; used imaginatively the software becomes transparent to the learner and encourages engagement. However, at its worst it simply embodies the concept of 'pay attention technology', replacing OHPs and blackboards (Reedy, 2008).

'I do think a lot of teachers rely on PowerPoint'. (Pu6)

A simple count of the types of activities using ICT in the lessons I observed supported this view (Figure 20).

This along with data from my earlier work informed the structure of Question 12 (P8), the results from which indicate little change in the task set for pupils using ICT (Figure 21).

Figure 20: Activities seen during lesson observations.

Activity Type	No. Lessons Observed In
Basic Display	94
PowerPoint	76
Lesson Pace	71
Interactivity	35
Pupil Devices	6
Multi-Media	55
Other Software	20
No Use	9

Q12. Can you rank the frequency of the tasks you ask pupils to do using ICT.
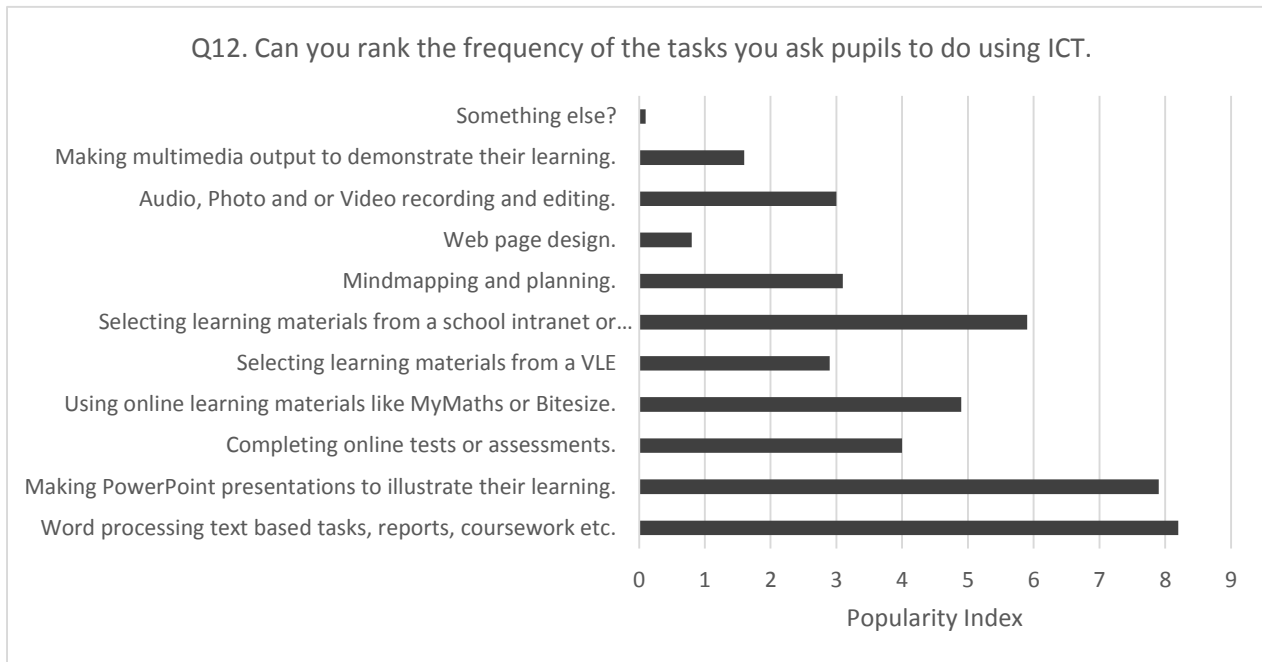
Popularity Index

[5] Popularity is calculated as follows: Each option is given a score by taking the ranking value given to it away from the number of options plus 1. For example, if the question asks respondents to put four options in order of preference, the top preference (1) will be given a score of (4+1)-1 = 4. The lowest preference (4) gives a score of (4+1)-4=1. If an option is not given a ranking, it is given a 0 score. This procedure means that the more popular an option the higher its score. The scores for each option are then totalled for all the selected responses to give a total score for each option. The total score for each option is then divided by the total number of responses to give an average score for each option. This average score will lie between 0 and the number of options (0-4 in the example above) – a popularity of 0 means no respondents ranked the option; a popularity equal to the number of options means all respondents gave it the top ranking.

The pressures that prevented real change, innovation and transformation are therefore not difficult to find. While BSF was at the fore front for those schools involved it was taking place on a background of school accountability at odds with an agenda of real systemic change. Teachers in BSF schools were still faced with the same curriculum, timetables and examination systems they had always had. In their busy and pressured lives they came to grips with their new systems, increased their skills where necessary and then continued as before (see 5.3 above).

4.1.2.4 *Transformation*

Given the title of this work, investigating this theme is fundamental. However considering the findings in the sections above it is no surprise that transformation was a concept around which interviewees found it difficult to articulate their thoughts and feeling (Draper & Nicol, 2006, p.1). From the very start this work has come across similar difficulties and after exploring the concept (see 1.5 and 2.1 above) I have come to the conclusion that if Government ministers and educational theorists could not clearly define or describe transformation, then it was possibly asking a great deal of my interviewees to try and do so (Fisher, 2006; Pearson & Somekh, 2006). When posed with the question 'has teaching and learning been transformed' there were some clear views.

> *'Has it transformed teaching and learning? I don't think IT is a thing to transform teaching and* learning, I think teachers do that. I think IT is literally is a tool to do a job*'* (T6).

This observation reflects the themes running through section 2.1 in the literature review (page 11). One individual did come close to an emphatic 'yes' to the question. As a young teacher at the start of her career, her 'before' context was her own time as a pupils up to the age of 18. With a four year gap at university she started teaching in our 'quick win' BSF school.

> **DH:** *'ICT was supposed to transform teaching and learning, are you delivering in a way that's* transformational in comparison to how you were delivered to*'*?

> **T4:** *'*Definitely, but I think teaching has changed full circle since then anyway. But I do think from an ICT point of view, from having a black and white OHP and a worksheet, from the pictures I think of in my lessons, I just think colours straight away. I think the visual side of my lessons helps to engage the students*'.*

This concurs with Brand's findings;

'there is a significant difference between the average attentions of a group of learners exposed to technology during a lesson compared to a group not exposed to technology'. (2010, p.1)

This again (see page 88) contrasts with some of my earlier observation on the negative impact of 'pay attention technology' and the positive impact of the use of multimedia content in lesson material that can improve engagement (Cooper, 2010) and change relationships in the classroom, when for example in English, art and music lessons I observed pupils demonstrating their own work and understanding to the rest of the class (Figure 20).

The confusion around transformation has its origins rooted at the start of the BSF process, when Head Teachers were asked to write their vision statements, a long way removed from what was to come. Burke argues that post war educational transformation and renewal was *'articulated as a powerful force for change'* but in contrast BSF vision was *'understood less as a projection into the future and more as an act in the present'* (2010, p.66). My own feelings are that BSF did in fact simply modernised the present; buildings and technology were updated so physical environments were contemporary and technology, however it had little real effect on the pedagogy of teaching and learning in this secondary school context. It is as if the new environments were quickly assimilated into the lives of their population, who then continued with life as before, unless of course, as Draper & Nicol infer, transformation was taking place unnoticed.

> 'But is any educational technology transformative, or is transformation impossible, even though it has been confidently predicted so often by so many? Can we be transformed without noticing it?' (2006, p.1)

Selwyn suggest that a starting point in being able to see '*digital technology for what it is'* may be achieved by '*deconstructing the nature of the digital transformation'* (Selwyn, 2013, p.17), an observation that I think offers a way forward. One possible practical solution could be to deconstruct the complexities of the technologies used in teaching and learning and investigate transformation on an issue by issue (e.g. VLE use, classroom interaction etc.) or item by item (e.g. IWB, handheld device etc) basis and ask stakeholders to plot them on what I have called in this context a 2 dimensional 'transformation index' (Figure 22) rather than a simple scale. On a matrix one could plot perception on any given item against two axes; one for simply updating or modernising existing practice and potentially making it more efficient or better than it was, the other for being innovative or totally new. Each plot would carry with it an explanation of its position provided

by the respondent(s) to help understand why they had chosen the position, with those in the top right hand quadrant being eligible for transformation status, in that context at that time. This would allow for the comparison of impact on different stakeholder groups and could be used over time to see if change in practice

Figure 22: Transformation Index
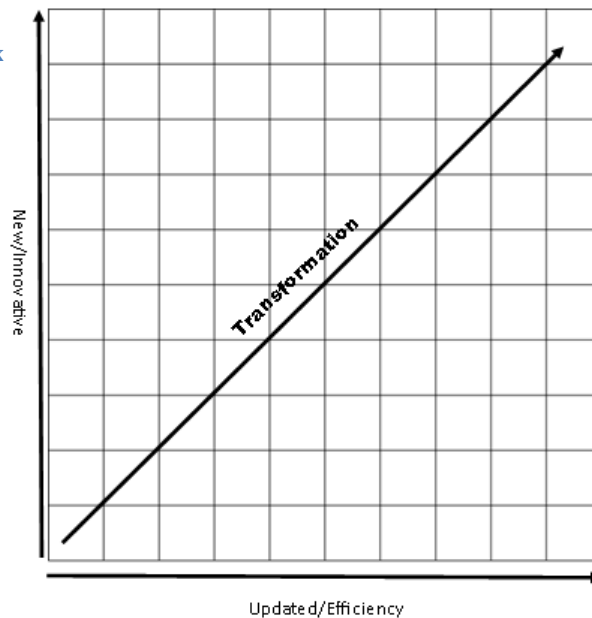
was radical enough to be considered transformational.

One example of this would be broadband connectivity, taken for granted now but arguably transformational for those who could access it when it was new and innovative. Plotted on a transformation matrix using evidence available at the time of its first use (Underwood et al., 2005) it was obviously considerably faster than dial up connectivity and therefore allowed for multiple users to gain access to a global range of media rich content.

Figure 23: Impact of Broadband Transformation Index
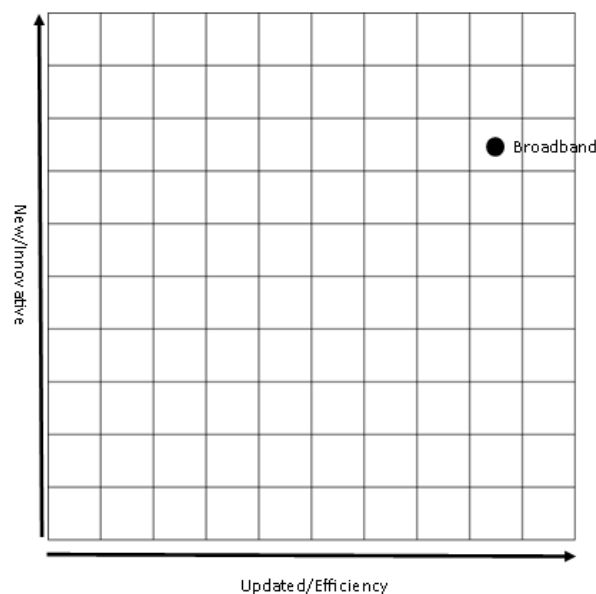
Figure 24: IWB TI Plotted at 2 different times
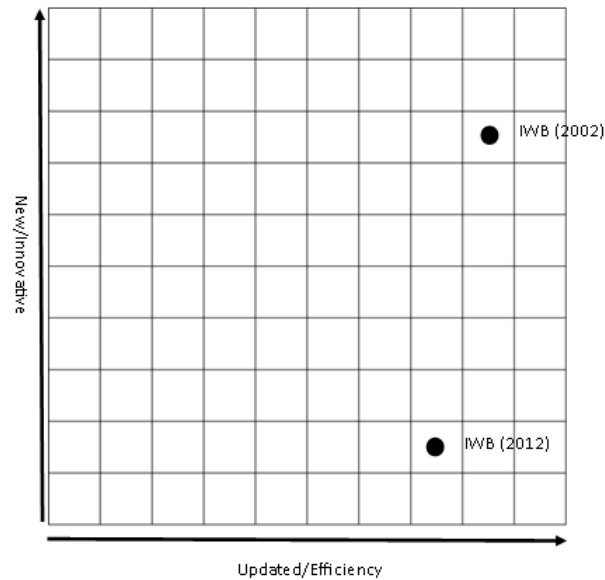
IWBs on the other hand could be considered to be an update of existing technology but only new in the sense that they were able to offer multimedia content efficiently. This is certainly true of BSF from the evidence from lesson observation, teacher and pupil interviews, presented here. However, their early use in the primary sector could have been seen as transformational at the time (Brna & Cooper, 2003). This gives a plotted TI a dynamic dimension, plotting developments over time and as their use evolves.

5 Chapter 5: Reflection and Conclusion

It would be impossible to argue that BSF did not set out in principle to address the major identified barriers to effective ICT use in classrooms as it attempted transformation;

- availability of devices,

- reliability and timely access to technical support,

- appropriate software and content

- and finally, teacher training

(Bingimlas, 2009; Becta, 2003)

BSF's successes were almost solely in the first of these and then diminished rapidly, initially at least, over the remaining three. Reliability did eventually improve and content was increased in both quantity and quality over time, however the suitability of software and content remained much the same. Sadly improving the skills of teachers was never addressed by any resources from within the programme, largely due to its capacity being held within the control of the MSP (Managed Service Provider) and its focus on 'training' rather than professional development, with priorities stemming rom he classroom. Laudable intentions and huge investment did have many positive effects. Schools were provided with a wide range of technological devices attached to sophisticated networks, learning platforms and collaboration tools. This was able to bring about positive changes in the lives of teachers and learners. For example, communication, planning, and sharing were all improved. Motivation was in many cases was also improved and learners felt a greater degree of independence. The frequency of multimedia elements that were perceived as engaging and motivational by both teacher and pupil groups within lessons grew, replacing more static materials.

However, Building Schools for the Future I believe was a programme whose strategies and design naively built in conflict at multiple levels, and these conflicts undermined any possibility of real transformation.

5.1 Conflict 1: Building schedules set against educational priorities

The time scale of the 'quick win' projects was, if anything, too short; subsequent projects failed to meet any deadlines and the programme was way behind schedule within a year. Pressure to complete building work and

ICT infrastructure installation (to avoid costly overruns) was the driver; little time or effort was given over to revisiting visions around teaching and learning (P1.1) transformation. BSF concentrated largely on the 'B'; projects became buildings exercise with huge amounts of money, time, effort and energy spent on 'kerb appeal' rather on the core activity of teaching and learning and its transformation. The procurement and planning model was being questioned as expensive not long after the first schools were opened. Commissioning bespoke buildings for every school alone added huge costs associated with architects and a whole array of consultants. There was no time to see ICT as only one of many tools in a school vision for improvement and use it in context when all of the evidence of success points to a confluence of enabling local factors (Passey et al., 2004; Fullan, 2011, p.3). As a reform designed at national level, BSF ignored the current context of individual schools and their stakeholders who were firmly rooted in the current climate of accountability. If reforms are 'refracted through each school context' (Goodson, 2001), then BSF faced many multifaceted prisms.

5.2   Conflict 2: Business priorities set against educational priorities

The meeting of the worlds of business and education was an uncomfortable interface resulting in conflict on numerous occasions. Some of these were simply at a practical level during construction, but more significantly at a philosophical level with Managed Service Providers whose contracts were designed to make a profit as well as offer a service (Selwyn, 2010, p.75). Consequently, the bureaucracy of BSF and contracts with MSPs were a block rather than an enabler. Excessive project and contract management became self-serving rather than serving education (Goss, 2001, p.15). The faith put in the PPP (Public Private Partnership) design of BSF in my opinion produced further evidence of the 'unproven' success of such models (Hodge & Greve, 2009) and therefore were not value for money or relevant to teaching and learning.

ICT suppliers bid largely because they had to, as the majority of future ICT spending from schools was to come through the BSF model. Prior to BSF central government alone had spent an extra £5.6 billion on ICT; that figure could only increase. The added dimension this time was that impact on teaching and learning was an explicit part of the rationale for the massive investment, previously they had been able to sell hardware and

software without any real post sales accountability other than warranties and updates. Suppliers would now be expected to offer solutions that facilitated the as yet ill-defined transformational agenda.

It was my feeling then that such solutions did not exist to satisfy the requirements that schools' ICT visions were encouraged to request. In spite of this, Becta representatives who attended the procurement meetings asked us to 'think outside the box' and challenge the market to deliver ICT solutions that matched the vision statements we had written. In order to help they provided, for example, (animated) concept videos that showed learners carrying mobile devices receiving assignments and feedback while still on the way to school, or an alternative learning provider. Having analyzed current attainment, 'push technology' akin to Amazon and iTunes informed the learner about what to do next and how to access it. Online trackers kept teachers and parents up to date with progress and alerts were sent in real time should any underperformance be registered. None of this was possible then, and that remains the case now. It was, I suspect, expected that market forces would pressure suppliers to developing such systems in order for them to continue to compete for contracts. None had the capacity or technology to do so. The question is, did BSF provide that 'final push'; the big policy that would pull all of the issues together, deal with the failings and mixed fortunes of previous attempts and galvanise all parties to produce the required solution? Regrettably, although the sums of money were large in educational terms they were nowhere near sufficient to fund such developments. The expensive contract bidding process meant that companies, unsure of success, were reluctant to invest in even more expensive product development in advance. After all, the UK market was actually quite small in corporate terms with financial returns on the same scale.

I have kept any reference to the revenue funding model of BSF till this point. Prior to the start of the process LA officers conducted an audit to establish the then current level of spending on ICT within the schools that were to enter the BSF programme. This figure was calculated at a 'per pupil' level and presented to bidders as a figure around which to base their bids. The result was a figure of £140 per pupil, or £140,000 per year payable monthly for a school of 1000; fixed at the start of the contract, and to run for 5 years regardless of a change in pupil numbers. Due to local socio-economic conditions and variability in the birth rate for example, one school's intake fell dramatically by 80 pupils per year while another had an increase of 50; their monthly charges remained the same, or rather increased as Providers were guaranteed an annual above inflation

increase of 4%. Schools' annual budgets, based on their pupil numbers are calculated every January. Those with falling roles were faced with a reduction in revenue without the ability to reduce cost. Even schools with stable or increasing income were denied the flexibility to prioritise their ICT spending. Moreover, the monthly payments to the MSP did not take account of any consumable costs, replacements or repairs other than those covered by warranties; neither did it cover any further capital expenditure. In fact it was through these avenues that the MSP hoped to generate even more income as they charged schools for 'projects' deemed outside the original contract. Consequently not only were schools unable to manage their own ICT spending they were faced with costs over and above those of the already expensive contract. As a result ICT developments were severely limited for 5 years unless they fitted in with the provisions of the contract. The cost of 'bringing in' new software or devices to the contract was prohibitive even if schools had the funding left to do so. Even more problematic was the inability of the service to evolve with technology without more added cost to the school. The explosion in the use of smartphones and tablets began not long after the start of the service. However, the design of the networks and their user and device management would not allow for the connection of such devices (in fact this was specifically prohibited) without significant and costly changes. So as the service came to an end in August 2014 schools were having to spend significant sums (upwards of £50k) to modernize their infrastructure after 5 years of stagnation.

The continuing rate of technological advance was totally ignored by BSF. A review of the IWB initiative pointed out the need to be aware of that initial investment was not enough with technology that was 'not standing still' (Smith et al., 2005, p.99). BSF did not allow for an almost constant reflection on what was being delivered so that plans could flex to embrace technological advances. For example, wireless technology specified at the start of the project was out of date before it was half way to completion as no scope was allowed for alteration to procurement and installation; what little local knowledge that existed was never given a forum to challenge decisions. As a result, the last school to be completed was being fitted with soon to be obsolete technology. Worse still, five years on, with BSF a programme deleted from DfS history and MSP contracts at an end, schools are left with a refresh millstone around their necks. Firstly they are saddled with a 'cost to change' if they felt the need to terminated existing contracts and engage new suppliers. Project costs (such as wireless upgrades and VLE replacements) of £30k were the norm. Secondly they had to deal with the upgrading of 5 year old infrastructure and devices. Servers and backup solutions were out of warranty and

devices at the end of their life. Virtualization (an innovative technology in 2008) was now the standard server design but would cost £50k to install, desktop computer replacement would be £400 per device with multimedia projectors about the same. One wonders what would have happened if BSF had not been cancelled. Wave 5 would have been ready to start while Wave 1 would need to be refreshed at the same time, a scenario that would then roll on into the foreseeable future with huge associated costs.

5.3   Conflict 3: The Clash of conflicting government policy agendas

The imperative to generate political capital from BSF perhaps did not allow time for any real reflection or evidence gathering on how to achieve the best outcomes from huge amounts of taxpayers' money and private investment. BSF for those schools involved, was simply another top down initiative, although the concrete and computers involved were more tangible than was typical of government initiatives.

So, the builders came and went (leaving an MSP behind) and schools simply got on with their core business in the same environment of assessment and accountability as they had before the bulldozers had arrived. They then faced, in 2011, significant new challenges presented by a new government and the education secretary Michael Gove that, if anything were a move to a more traditional curriculum and testing regime with little interest in creativity and flexibility in the opposite ideological direction of New Labour initiatives.

> As a result, rather than contributing to substantial improvement, adopting improvement progr ams may also add to the endless cycle of initiatives that seem to sap the strength and spirit of schools and their communities. (Hatch, 2000, p.4)

Head Teachers had accepted their visions statements were loaded with 'semantic irony' subconsciously adopting visionary terminology and rhetoric, largely because it was what they had to do and their own experience of classroom technology was many years out of date. Firstly, their professional credibility was to be judged by it, (even if they were possibly ill equipped with neither the experience or understanding to underpin those visions), and secondly because the funding would not be released without it (Wallace, 2008). Also used to managing internal change, they now faced a *'crisis of positionality'* caused by conflicting agendas with *'no firm ground to stand on'* while having to accept that *'to remain in the same place is to risk*

one's position being changed nonetheless' (Goodson, 1999, p.279). During the short life of BSF there was a change of government, Ofsted had at least 2 new 'frameworks', 'floor targets' set for schools were increased, pupils were all required to make at or above 'expected progress' across 8 subjects at GCSE including English, Maths, Science, MFL and Humanities subject. Vocational and creative arts subjects were either removed from those that counted in league tables or modified to include terminal examinations. This is possibly the biggest conflict of all that sets one government policy against another, specifically here the quest for transformation set against an established and entrenched accountability framework too risky to experiment with and because of this leadership and vision at local level were largely marginalized and professionalism undermined (OEDC, 2001; Mansell, 2007; Wallace, 2003).

I conclude this section with extracts from press releases and newspaper editorials that add to my argument. While presenting my work at the BETT Show in 2012 (P4.4), I was able to obtain entry to hear the then Education Secretary Michael Gove give his key note speech and state;

> *'Technology is already bringing about a profound transformation in education, in ways that we can see before our very eyes and in others that we haven't even dreamt of yet.'* (Gove, 2012)

Further on in his address he observed;

> *'A Victorian schoolteacher could enter a 21st century classroom and feel completely at home. Whiteboards may have eliminated chalk dust, chairs may have migrated from rows to groups, but a teacher still stands in front of the class, talking, testing and questioning'.*

I found this ironic at the time and even more so now considering the curriculum changes that were to follow. The Cambridge Primary Review was concerned about the negative impact on creativity of the new national curriculum (Alexander, 2013), although anyone looking for that report today will get only *'Not found, error 404: The page you are looking for no longer exists'*. A summative article about the report in the Independent quotes the report and refers to Mr Gove's producing a 'neo Victorian curriculum' educationally inappropriate for the 21st century (Garner, 2013). The same journalist reports on the written support CBI director general John Cridland received for his call that schools be allowed to' move away from the exam factory model' (Garner, 2014).

Trying to form conclusions about the impact of BSF in isolation is potentially fraught with difficulty considering its position in the overlap of the complex worlds of ideological trends in the theory of education and government policy, trends that began with the Education Reform Act of 1988 (Ball, 2008). By 2000 the

relationship between education and state was described as 'congested' (Skelcher, 2000). Jessop sees a power relation developing as government continues to exert an influence beyond previously understood boundaries.

> *'Much will depend on the ways in which new governance mechanisms are linked to the pursuit of changed state goals in new contexts and to the state's capacities to project its* power into the wider *society'.* (2002, p.203)

Specific illustration of this can be found in Fielding's observation that the Ofsted process is a 'failure of democracy' (2001) as inspection schedules and judgment criteria become politicized and the introduction of Education Action Zones (Gewirtz et al., 2004).

The principles of BSF with its transformation agenda and contemporary designs it could be argued, reflected the ideological position of those interested in learning (Papert, 1999; Mäkitalo-Siegl et al., 2010; Preston, 2000; Hoban, 2002; Laurillard, 2007) and in particular a pupil centred constructivist approach. Unfortunately BSF became almost a battle ground between this ideology and that of government policy driven by the accountability agenda and the commitment to the use of the private sector (Ball, 2009). Sadly, from my current positions in both time and place the latter triumphed.

5.4 Conflict 4: Change

It would be difficult to argue that BSF was not a planned change. However, that planning took place well away from the teachers who would be ultimately responsible for delivery. Not only was each school at a different stages of readiness to deliver what was expected, so were individual teachers.

A key issue from the start was the distance between policy makers and practitioners. The knowledge that ministers had at a detailed contextual level of the schools they hoped to impact upon, was very limited, and therefore the outcomes of the change process could not be assured.

These pressures are just those included in Fullan's 'wrong drivers' of educational change (Fullan, 2011), those of top down 'imposed accountability' mixed in with 'fragmented strategies'. The obvious manifestation of this was new buildings of contemporary design running 25 lesson week of a traditional curriculum with unchanged accountability regimes on their opening. In an earlier work Fullan pointed out notes the confusion this can cause.

> *'One person claims that schools are being bombarded by change; another observes t*here is nothing new under the sun. A policy maker charges that teachers are resistant to change; a teacher complains that administrator introduce change for their own aggrandizement and that they neither know what is *needed nor understand the classroom'.* (Fullan, 2007, p.3)

5.5   Conflict 5: Too many things to do and not enough time to do it

Unfortunately, with already crowded lives, teachers had little time to embrace the full potential of the new technology, resorting to finding their own level of competence and sticking well within their own 'comfort zone' (CZ); many embraced what they had to and stayed there. Using Vygotsky's ZPD concept (page 39),

Figure 25: Comfort Zone Applied to ZPD
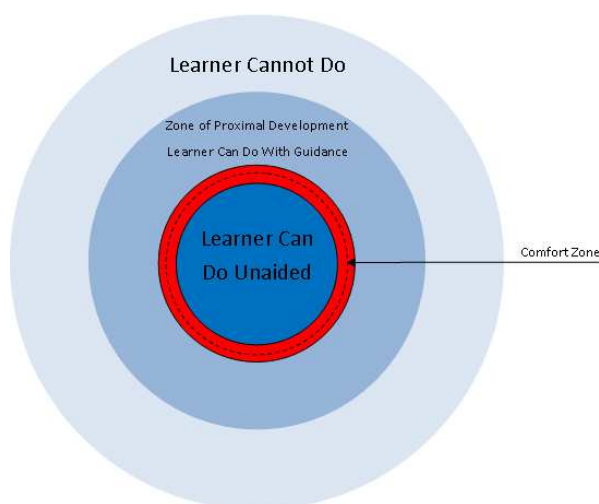
here seeing teachers as learners, it is possible to position the CZ within this model (

Figure 25). Teachers seldom ventured above the central zone in their use of ICT. Poor CPD design and little access to any other source of skills development resulted in little improvement in confidence or shift in pedagogy resulting, certainly in the secondary schools in this study, with updated but old infrastructure being used largely as 'pay attention technology' where 'Lesson Objectives' and PowerPoint ruled. BSF may well have been portrayed as a 'triumphalist s*ymbolic action'* by politicians but it paid little attention to *'teachers' personal mission'* and so the triumph was *'short lived'* (Goodson, 2001).

High hopes were placed on the next generation of teachers. As perceived 'digital natives' they were expected to bring a new skill set to the profession. However, their level of expertise in technology was limited to their

personal rather than professional world. Confident with ICT they may be but their understanding of its use to transform teaching and learning was no better than the 'digital immigrants' they joined on their first teaching post. Given the fact that the 'digital native' concept is flawed and that pupils' use of technology is much too narrow (Thompson, 2013, p.23) and may serve to hinder rather than be fully exploited for effective learning, it must be asked as to why much of the expectation of transformation (or blame for the lack of it) is being placed at the feet of teachers past, present and future, surely the need is for all learners (both teachers and pupils) to be given the skills to make best use of the technology available.

The failure to truly deliver any real transformation can I believe be put down to a complex inter-relationship and conflict between multiple agendas explored above. There is no doubt that teachers and pupils found themselves in modernised physical environments with a huge amount of ICT equipment but their educational context remained unchanged. BSF built capacity in the wrong places if transformation was expected. There was the obvious increased funding capacity and the resulting increase in the quality and quantity of technological systems. The procurement, installation and support of all this infrastructure, software and devices was enabled by a huge increase in management capacity through an MSP but no thought was given to increasing the capacity within the workforce to best assimilate the possibilities of using it in any real innovative ways. The time scale was also too short and the centre of reform too far from the classroom, an observation supported by Wallace.

> *'Once the irony is accepted that tightly controlled transformational reform is unrealistic, a mo*re promising alternative becomes promoting incremental improvement within broad consensual limits of acceptable practice. Expanding the scope for teachers to make professional judgments is a more realistic approach to fostering educational improvements in *diverse contexts'.* (2008, p.1)

Three years after Michael Gove opened BETT, his successor gave her address in 2015. Although she seems less certain about how or where, transformation remains as part of the rhetoric.

> I will be looking for ideas in a number of areas where I think technology can transform the educational landscape.(Morgan, 2015)

I was not at BETT in 2015, but I did catch The Who on their farewell tour. I left with the final verse of their encore ringing in my ears;

'Don't get fooled again,
Yeah
Meet the new boss,
Same as the old boss,'

(Who, The, 1971)

6   Chapter 6: Impact and Future Work

Early results of this work precipitate a major revision of my schools approach to CPD. Firstly I managed a consultation to restructure the school timetable to remove a taught period of PSHE, incorporate this into a registration period extended by 10 minutes each day and so create a 24 period week (P4.1.1). School now starts at 8.40 a.m. and for pupils, finishes at 2 p.m. on a Tuesday: staff CPD starts at 2.15. In adding the gained hour to existing directed time I therefore created a weekly 2 hour CPD session. Each member of staff was asked to put an 'ICT and Teaching and Learning' item into their performance management objectives, for some that was to offer their support as 'champions', run CPD workshops (P4.1.2) and continue supporting colleagues in building the scaffolding to help them reach beyond their comfort zone; there was also one structured session every half term. I proposed the creation of a new role, that of eLearning Manager to governors. They agreed and an appointment was made; staff now have a key person who has the skill and capacity to support them, particularly in the creation of resources and use of the VLE. In lesson support was offered, the eLearning manager, an ICT technician or myself became 'bookable' to be in lessons with teachers offering 'real time' support. I also continued to lead sessions on the impact of ICT on teaching and learning (P4.1.3). The evolution of this was the creation of a 'Teaching and Learning' group with members from each school faculty. Their task was to continue supporting colleagues and run small action research projects of their own, many relating to ICT; it was from this group I obtained my teacher interviewees.

Much of this innovation was shared at an LA level (P4.2) and with partnership schools (P4.3). I was recommended to present some of my findings at BETT in 2012. The acceptance of my submission was accompanied with the offer to sit on two seminar panels (P4.4). Much of BETT is an international trade fair; my full audience was very cosmopolitan and I wondered what the vendors in the main hall below would make of my message to delegates to spend little, return to their own country or county and be clear about what they want ICT do.

The cancellation of BSF had a major impact on this work and was hugely disappointing for those schools whose advance 'Wave 2' plans were scrapped. For me it meant the originally planned impact of this work had

nowhere to go. However, now schools are being encouraged (or will have little choice) in becoming increasingly autonomous in managing their organisations. LA influence is being reduced as funding is channeled directly to schools. The choice and nature of support services and advice is being left up to schools to decide. It is expected that the majority of schools will acquire the ultimate independent Academy status. The expected reduction in prescription from the National Curriculum will allow each school to design and deliver content and teaching and learning as best suits them. Ofsted (with a budget reduction from £266m to £146m) have another new framework for inspection that will rely on historical data and 2 day visits to schools. Crucially, like the rest of the public sector, schools will have less money to spend.

School leaders will need to balance the requirement for improvement within all of these constraints. Investment in ICT will potentially be at the centre of the conflict between the pressure to innovate and avoid deficit budgets.

This work and its findings could therefore be crucial in informing schools where best to focus their efforts and investments. Explaining the difference between simplistic spending and resourcing a vision that impacts on teaching and learning is a lesson learnt from this research.

This is already happening. Only two of the original 8 BSF schools are staying with the MSP, on one year contracts. I have been instrumental in planning our own exit strategy and reducing the cost to change to a minimum while at the same time introducing improvements that address the legacy issues of 5 years stagnation (P4.5). In doing this I have involved other schools in my planning and helped them with their own processes through my membership of the 'Way Forward' group (P3.5-7, P4.9). Documentation and specifications of mine were used by all in their own school's process (P.4.10) as I organized and managed both 'soft market testing'[6] for the group (P4.6). Although this appears to focus on the mechanics of appointing

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[6] Soft Market Testing is of organisations finding out about new ideas and service choices possible before they complete tender documents. Organisations need not follow the idea they talk about. Invited providers present their possible solution and ideas before the official procurement process begins.

contracts, the reality was far from that. Throughout the process I continually stressed to schools the need to have teaching and learning as a focus and provide systems to support their aims.

This influence has reached beyond the old BSF cluster into other areas of the LA, including a MAT (Multi Academy Trust) and the PRU (Pupil Referral Unit). Bringing in a neighbouring primary school and forming our own MAT has enabled me to extend our ICT service to rapidly develop them to a position they could not have possible achieved on their own, allowing teaching and learning access to better tools as a result.

I expect these types of developments to continue and therefore allow me to have more of an impact as an individual than would have been possible within an LEA and BSF programme.

On reflection I started this work with rather naïve and simplistic thoughts. I accepted the transformational rhetoric (Rudd, 2013, p.148) without question, in fact I may have helped perpetuate it (P4.2) and therefore saw the BSF process and its ICT investment as the once in life time opportunity to make it happen. As I put together my literature review and began the collection of data, it became increasingly obvious that much more complex and insightful investigation was required. What emerged was a history of conflicts that BSF seemed to sharply focus, with myself placed squarely in the middle. This work therefore proved invaluable in allowing me to offer informed arguments and make an impact at a strategy level when sitting around meeting tables when national, regional and local decisions were being made (P4). However, I am proud to report the impact I feel I have made within my organization, in what I believe is the true spirit of this qualification. Further publications of my findings will also add to the knowledge base about ICT and learning and allow my findings to be of wider use to the educational community and policy-makers.

Schools are complex organisations, and although BSF was a fantastic opportunity for my own, it added extra expectations, pressures and conflict throughout its many layers, from classroom, to staffroom and leadership. This work gave me the confidence to mediate in areas of tension, supporting the school to see its way through the need to deal with multiple agendas, regardless (or in spite of) the answer to my original research question and the title of this work.

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