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## E-confidence or incompetence: Are teachers ready to teach in the 21st century?

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### Abstract

Despite high levels of government funding over the last decade, recent research would appear to indicate that a diverse landscape still exists in primary and secondary schools in terms of teachers' ICT skills, use of resources, and implementation of pedagogy and practice in UK schools. Following the recent change of British government in May 2010, however, there have been significant cuts in funding for ICT in education despite evidence which suggests that the percentage of schools considered to be e-mature is relatively low. This small-scale study, which was commissioned by Becta from September 2008 to March 2009, sought to answer the question: What is the extent and nature of the ICT skills and competencies of the teaching workforce? The aim of this research, when it was commissioned, was, primarily, in order to inform the government at the time as to the on going implementation of the Harnessing Technology Strategy. The main purpose of the research was to gain a better understanding of the CPD needs of teachers so that mechanisms could be put in to place to bring about a step-change in order to further evolve the ICT skills and competencies of the UK teaching workforce. The findings which emerge here would not only support the view that teachers' skills and competencies are diverse, but would also indicate that the continuing professional development needs of teachers could benefit by reconfiguring the learning community to facilitate an environment in which pupils are teachers and teachers become learners.

*Keywords:* e-confidence/e-maturity; ICT; primary education; secondary education; teachers

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### 1. INTRODUCTION

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Britain is contended to be one of the world leaders in the use of technology in education with at least £10 billion having been invested since 1999 (The British Educational and Technology Association [Becta], 2008a) and following the *Harnessing Technology Schools Survey 2009 Analysis Report* (Rudd, Teeman & Marshall, 2009) it would appear that the vast majority of teachers in the UK are both enthusiastic and confident in using ICT to support teaching and learning and that this is a trend which has continued in recent years (Kitchen, Finch & Sinclair, 2007; Smith, Rudd & Coghlan, 2008a and 2008b). Given that high levels of both confidence and usage have been documented, it may be useful to consider these in the context of the types of ICT application and the way in which they are used. Interactive whiteboards [IWBs] would appear to be the dominant technology in UK schools which are 'used primarily for presentational purposes' with between 33 and 50 per cent of teachers using them in all or most of their lessons (Smith *et al.*, 2008a, p. 40). The internet would also appear to be increasingly used confidently by teachers to support teaching and learning, and is an area in which teachers feel they need the least Continuing Professional Development [CPD] (Marshall, Teeman & Mundy, 2009; Smith *et al.*, 2008a). However, despite the majority of teachers having received some form of training in the use of ICT in recent years, and given the levels of confidence noted above, ICT is still a major professional development need. 'Using ICT in teaching' has remained the most frequently selected topic for CPD in the *General Teaching Council Survey: Report on Trend Data* (Ashby, 2007) and is among the top three perceived needs for all but the most recently qualified teachers. The high demand for ICT CPD within the teaching workforce overall would appear to continue. According to the *Harnessing Technology Schools Survey 2009 Data report – Part 1, descriptive analysis* (Marshall *et al.*, 2009), the latest findings create a picture of on-going need in both the primary and secondary sectors. Teachers were asked whether they needed a little or a lot more development in a range of different ICTs. With the percentages combined, for those needing a little or a lot more support, teachers report that they need further development with: software packages (79% primary, 80% secondary); technology for teaching and learning (82% primary, 76% secondary); creating electronic resources (79% primary, 69% secondary), supporting pupils' use of technology (85% primary, 79% secondary) and the use of digital video or camera equipment (69% primary, 70% secondary). The use of learning platforms was also identified as a need with 61% of primary teachers and 79% of secondary teachers saying that they required more development in this area, although 32% of primary teachers felt that the use of learning platforms was not applicable to them (p. 295 – 298).

Why such an extensive need for CPD still exists is a complex question, particularly given the high level of government investment in ICT training initiatives over the last decade. The main aim of the New Opportunities Fund [NOF] programme, which ran from 1999 – 2003, was to bring all full-time classroom teachers up to the ICT standard of a newly qualified teacher and according to the Department for Education and Employment [DfEE] (1997) the purpose of NOF was essentially that by 2002 serving teachers should generally be competent to teach ICT within the curriculum. Conlon (2004) recognises that the NOF programme was much more than this and that it was, in fact, the most complex initiative for teachers' CPD ever undertaken in the UK. In response to teacher feedback following the short-comings of NOF, the Department for Education and Skills [DfES] (2004)

launched the Hands on Support [HOS] programme which focussed on delivering peer to peer support provided by 'credible professionals' (p. iii). This approach to CPD was not only differentiated to meet the needs of individual teachers, but was also aimed to be subject or phase specific and delivered within the classroom environment. The guidance for HOS providers (DfES, 2004) emphasises the need for a structured approach when matching support to teachers' needs and suggests that analysing or carrying out an audit of teachers' existing skills and identifying developmental needs is an important part of this process. Using an audit or a 'diagnostic tool' enables training to be tailored to meet the 'current level of experience and confidence' of the teacher and thus enables an agreement of the required outcomes (ibid. p.6). Ofsted (2009) have identified that there would appear to be a correlation between institutions where there is good subject knowledge and where ICT skills are systematically audited. Ofsted (2009), however, noted that 'audits of staff needs were rare' and despite the availability of training, 'there was usually no formal system for measuring [their] impact on improving teaching and learning' (p. 25).

As noted earlier, the most pervasive use of technology in recent years is the IWB, where, in the majority of cases, the IWB is used for whole-class teaching during the introduction and plenary sections of the lesson. In Key Stage 2 (pupils aged 7 – 11), more skilled teachers use it integrally throughout the lesson whereas in Key Stage 1 (pupils aged 5 – 7), the IWB is used with individuals or small groups, sometimes under the supervision of a Learning Support Assistant [LSA]. In the primary sector, IWBs are most commonly employed to support literacy and numeracy with a third of these lessons employing the use of this technology (Somekh *et al.*, 2007). Although some research studies (Barton and Haydn, 2006; Thomas and Stratton, 2006) have explored the use of ICT in the secondary sector, a coherent, national landscape of how ICT is used in different subjects at this level would appear to be lacking. However, an earlier finding, (Becta, 2006) was that IWBs were used most frequently in secondary schools by mathematics teachers with 60 per cent reporting that they used them in half or more lessons.

There would appear to be a significant amount of evidence from the literature to suggest that practice between the primary and secondary sectors varies considerably, to the extent that Becta (2006) noted that there are 'sometimes stark differences between the two' (p. 59). Historically, primary school teachers would not only appear to be more confident in using ICT in subject teaching, but use it more frequently than their secondary counterparts. Findings from the *Evaluation of Curriculum Online* (Becta, 2005) show primary teachers as having higher levels of confidence in every year in the period from 1998 to 2004 and in terms of frequency of use in 2004, secondary teachers only matched the same levels of primary teachers when using IWBs. Almost twice as many primary teachers used computer packages in half or more of lessons as secondary teachers and they also made more use of internet-based recourses and subject specific software. From the findings of the 2008 *Harnessing Technology Schools Survey* (Smith *et al.*, 2008b) it would appear that a similar trend has continued, with the primary sector making better usage of computer packages with 51% of primary and 44% of secondary teachers saying that they used these packages in most or more than half of lessons. Primary teachers are also more inclined to use display technologies with 86% using them on a daily basis as opposed to 73% of secondary teachers - and they still continue to make

more frequent use, on a weekly basis, of internet-based resources and subject-specific software (Marshall *et al.*, 2009, p. 198 – 199).

A common area of weakness, however, in both the primary and secondary sectors is teachers' knowledge of data handling skills and controlling events using ICT and this was determined to be 'weakest in data logging, manipulating data and programming' (Ofsted, 2009, p.6). In the secondary sector, 'coverage of control, sensors and databases' was limited and in the primary sector, recent developments in ICT meant that some teachers had fallen behind and had not maintained or developed their subject knowledge and expertise, especially at Key Stage 2, where the use of control technology and spreadsheets are required. In addition to this shortcoming with the use of more traditional ICTs, newer technologies are also reportedly under employed. For example, the application of Web 2.0 technologies such as instant messaging, wikis, blogs, and online discussion groups being 'extremely uncommon' with 'a sizeable minority' of primary teachers unfamiliar with these types of software and a quarter of secondary teachers never having heard of wikis (Becta, 2008b, p.32). The most recent findings (Marshall *et al.*, 2009, p.203 - 205) clearly show that although the use of web 2.0 technologies to support teaching and learning is stronger in the secondary sector, the extent of use is still low – for example, only 7% of primary teachers and 23% of secondary teachers encourage learners to use wikis to some or a great extent (p. 202). Although the figure for the use of social networking is much lower – 2% and 6% respectively – the most common use of web 2.0 technology in the classroom is podcasting with 9% of primary teachers and 30% of secondary teachers using this technology to some or a great extent.

When considering the reported high levels of teachers' confidence and usage of ICT, this paper would suggest that this may be limited to certain types of use, for example, a preferred tendency towards display technologies for whole class teaching (Becta, 2008b) or the prolific use of multimedia and word processing (Marshall *et al.*, 2009). Research would also indicate that some teachers in both the primary and secondary sectors feel their status is threatened because they find themselves in a situation where the pupil is more skilled and knowledgeable than they are (Condie *et al.*, 2005 and 2007; Ofsted, 2009). This current gap in teachers' knowledge, understanding and awareness of Web 2.0 technologies remains a cause for concern, and one which is highlighted in the *Harnessing Technology: Schools Surveys* for both 2008 and 2009. Smith *et al.* (2008a) cite a number of studies (Bryant, 2007; Luckin *et al.*, 2008; Walker *et al.*, 2008) which would all seem to point to a lack of effectiveness in using Web 2.0 technologies to support learning in the classroom with a lack of guidance on using these technologies being noted as a particular barrier, despite the beneficial role that such technologies can play in supporting learning. The findings of Conole, de Laat & Dillon (2008) would suggest that most pupils are immersed in a technology-rich environment and that they 'select and appropriate technologies to their own personal learning needs' and that these findings 'have profound implications for the way in which educational institutions design and support learning activities' (p. 511). At this point it is worth noting that when teachers were surveyed on the usefulness of different sources of advice about using ICT in teaching, 21% of primary teachers and 43% of secondary teachers cited pupils as being helpful or very helpful (Marshall *et al.*, 2009) and this is a theme which will be returned to later on.

Given this emphasis on the ICT experiences of the younger generation, there would appear to be a far greater body of research into the skills, competencies, attitudes and experiences of NQTs or those in Initial Teacher Training [ITT] (see, for example, Barton and Haydn, 2006; Hammond, Crosson & Fragkouli, 2008a; Hammond, Fragkouli & Suandi, 2008b) than longer-serving members of the profession. As Hennessy and Deaney (2004) point out, 'little is known about the influence of teachers who have already established ways of working with ICT' (p. 2). Likewise, there also exists the perception that those new to the profession are more experienced with ICT and are more committed to its use than longer-serving teachers (Hammond *et al.*, 2008a). Indeed, as Condie *et al.* (2007) have observed, the majority of teachers in the classroom today trained before ICT became a significant development in education. As a result, ITT programmes now provide trainees with the skills and competencies needed to use ICT within their practice. However, it is wrong to assume that all new entrants to the profession will have the same levels of confidence and there is a risk that teachers will continue to use 'safe' technologies with which they are familiar with, rather than exploring creative alternatives.

## 2. METHOD

A review of the current literature reveals a diverse landscape in which it is clear that there is still disparity in terms of the move towards an e-mature teaching workforce. Due to the ever changing nature of ICTs, current literature – particularly journal articles – may well present out-dated information. And it is for this reason that it was considered pertinent to investigate the situation through a series of one-to-one case studies with key stakeholders in the workforce. Using the findings from the literature as a barometer, a questionnaire was devised to explore the following themes:

1. Approaches to assessing ICT skills;
2. Auditing ICT skills;
3. The nature of ICT skills sets and specific ICT skills;
4. Contrasts in ICT skills between different groups of teachers;
5. Barriers and enablers.

Although the sample size of this report (six respondents) may be considered very small, those people who were interviewed were judged to be a representative sample of the workforce as they included Local Authority personnel, head and assistant head teachers as well as ICT coordinators working in both the primary and secondary sectors within the UK. The respondents consisted of two males (a Secondary and Primary Local Authority School Improvement Advisor and an Infant Head Teacher) and four females (a Primary Local Authority Advisor, a Secondary Assistant Head Teacher with responsibility for ICT, a Primary Head Teacher and a Primary ICT Coordinator). Each of the respondents selected were seasoned professionals with between 15 to 25 years experience of ICT in education, and were either in managerial or senior managerial positions within the settings they worked. The questions were delivered to the respondents in advance of the interview so that any

misunderstandings could be dealt with before the interviews took place. In line with Star Chamber protocol (a UK government gateway process to assess the collection of data which places minimum burden on front line staff), the names of those members of the workforce being approached were presented to Becta beforehand. The interviews took place individually and were recorded digitally and transcripts were then word processed. All participants signed an ethical clearance form giving their consent to be interviewed with the right to remain anonymous as well as having the option of withdrawing their contribution to the research at any stage. For the purposes of this report, the participants will be referred to in the following way: SAH – Secondary, Assistant Head Teacher; PIH – Primary, Infant Head Teacher; SPLA – Secondary and Primary Local Authority School Improvement Advisor; PLA – Primary Local Authority Advisor; PH – Primary Head Teacher; PC – Primary ICT Coordinator.

The nature of the interviews was semi-structured and in some cases additional questions were asked to explore or clarify issues; in other incidences, some questions were not asked as responses given previously answered subsequent questions. The questions asked were grouped under headings and these headings have been used in this report to structure the findings from the interviews. Where appropriate, some responses have been linked to findings from the literature, although the purpose of the report is not to reflect the literature, but rather to present a current snap-shot of where teachers, schools and local authorities actually are in terms of their journey towards e-maturity.

### **3. FINDINGS**

#### ***3.1 Approaches to assessing ICT skills***

Respondents were invited to share the ways in which ICT training was delivered, and how these skills were built upon. Primary respondents reported a number of approaches including planned in-service education training [INSET] based on the school's improvement plan as well as 'last minute INSET' which came from what was being seen in class on a 'day to day basis'. Informal *ad hoc* training was also employed, for example where skills once learned, but forgotten, were revisited through informal support. Off-site training was also mentioned with staff returning to school and cascading skills to the other teachers including Teaching Assistants [TAs]. SAH indicated that although the vast majority of training in her secondary school was delivered inter-departmentally, training to meet individual needs was also available and skills were built upon by moving to the next level of competency.

In line with the perceived demand for CPD reported in the research, SPLA explained that in his local authority 'there's loads of training going on' at both primary and secondary level much of which is school based and at 'different levels' to meet the different needs of teachers and technicians. When asked how the training was built upon, SPLA talked about having 'user group meetings' which are intended to continually build on staff skills. The picture presented by PLA was similar to one given by SPLA, where she noted that 'we really try to tailor it much more to schools' needs.'

### **3.2 Auditing ICT skills**

Although the latest report from Ofsted (2009) makes the recommendation that all schools should formally audit the ICT skills of all teachers, none of the respondents in this study were able to indicate that this provision had fully taken place in their setting. Only 2 of the 6 respondents (SAH and PLA) were attempting to use formal auditing tools and even in these cases, the system of auditing was at the developmental or initial stages of implementation. The audit in SAH's case, included gathering information about 'generic skills' as well as 'subject specific skills' and the inclusion of basic skills, for example inserting a picture into a Word document, would appear to confirm the notion that these fundamental competencies are still lacking – or are at least still being tracked – within the current workforce. It would also appear to suggest that some teachers' still haven't acquired these basic skills and as PLA pointed out although there are 'lots of audits out there' all they do is tell the teacher 'what they don't know.'

At local authority level, PLA said that she was able to use audit information to inform the planning of CPD provision within her Local Authority. For example, during the interview, PLA was able to point out that 'worryingly' 39% of teachers using the audit tool did not know how to use a ready made database and that most teachers (61%) weren't able to create a branching database and just over half (54%) didn't know how to sort data in a spreadsheet.

PLA commented on the claim that because the government have 'put so much money in IT in schools everyone knows how to use it' as being unsubstantiated, because from the statistics available from the audit PLA noted that even 'the basics still aren't being done.' This would seem to echo recent findings in the literature where Ofsted (2009) point out that data handling, programming and skills in control and modelling are still lacking in the armoury of skills, both in the primary and secondary sectors. It would also appear to support the notion that the high levels of ICT confidence reported are not linked to the wider uses of ICT.

### **3.3 The nature of ICT skills sets and specific ICT skills**

Overall, there was generally a strong level of agreement in response to the question: *To what extent are there still teachers who lack basic skills, such as file management, WP skills? And how are their needs met or supported?* Two of the respondents were instantly able to cite teachers who did not even possess the sufficient ICT skills to send an email. SAH responded to the question by noting that at least 30% of secondary staff in her school lacked basic skills such as understanding file extensions, how to organise files or realising 'the need to name things in a meaningful manner.' Although PC reported a similar situation to SAH, this was more in terms of TA skills, rather than teaching staff. On the flip-side, PC and PIH noted that there were no teachers in their schools who lacked these basic skills. None of the respondents, apart from SAH (and SPLA in the previous question) indicated how a lack of basic skills would be supported.

At the other end of the spectrum, respondents were asked to comment on teachers who possessed advanced skills and how this expertise was built upon. At Local Authority level, both primary and secondary respondents discussed the fact that it was not so much technical skills but rather a lack of good pedagogical knowledge about how to use ICT to support learning. In both sectors, leading ICT teachers were seconded from schools so that good practice could be shared and disseminated.

Recent research has shown (Becta, 2008b; Cox and Marshall, 2007; Somekh *et al.*, 2007) that few teachers would appear to employ a wide range of ICT applications in their teaching, and that usage is confined to only a few types. Respondents were asked how true they felt this was in their setting, and their responses would appear to support the research. It was reported generally that staff were: reluctant to embrace the introduction of new ICTs, for example a pupil voting system (SAH); used only a small number of programs from a wide range available (PC); failed to use ICT resources (digital cameras) which were kept in cupboards (PH). In line with the findings of Somekh *et al.* (2007) PH noted that although staff were making reasonable use of IWBs, only 'the odd teacher . . . uses it really well.' At Local Authority level, SPLA agreed that teachers' uses of ICT were generally limited but felt that this was changing and wasn't necessarily true in the Early Years Foundation Stage [EYFS]. PLA agreed that most teachers stuck to the 'comfort areas' like word processing and internet research, but felt this was because many schools had abandoned, but not replaced, the outdated Qualifications and Curriculum Authority [QCA] scheme of work for ICT.

*Respondents were then invited to comment on what they felt their strengths were in terms of classroom practice in their setting. This question gathered a wide range of responses, and revealed, overall, some good examples of how schools and Local Authorities are moving towards e-maturity. For example, Ofsted (2009) identified assessment in ICT as being a particularly weak area in both the primary and secondary sectors, although PC revealed this to be one of the schools' strengths. PIH and SAH would also appear to be addressing gaps in the use of Web 2.0 technologies which has been identified as an area for development by recent research (Smith et al., 2008a). For example, PIH mentioned that teachers in Year 2 were starting blogging with the children. SAH reported that in her secondary school, training in the use of wikis had taken place in some departments and training staff in podcasting was imminent.*

### **3.4 Contrasts in ICT skills between different groups of teachers**

In order to try and understand whether there were any differences in practice between different groups of teachers, the respondents were asked whether they felt that NQTs were better skilled than longer serving teachers. All of the respondents indicated that they thought this was the case (a finding also reported in the literature, see: Hammond *et al.*, 2008a; Sime and Priestley, 2005) although at a Local Authority level PLA noted that some teachers who were in their forties or fifties were leading ICT teachers. Secondary NQTs were generally felt by SAH to be better skilled 'in terms of less fear and more expectation.' Reasons given by respondents supporting the notion that NQTS were better skilled included a high level of input during their training as well as the fact that many younger NQTs had grown up using computers at home and in school, whereas older staff had to 'get

to grips with it.’ PIH made a similar response but added that ‘established staff have made a really, really huge effort to embrace technology.’

The respondents were then asked whether they felt age was a factor in terms of levels of ICT competence. The reactions were mixed. PIH said ‘yes’ but felt that it wasn’t just down to age but that ‘the younger they are, the more open minded they are to embracing technologies.’ PLA commented on the use of Web 2.0 technologies and noted that this might present more of a challenge for older teachers in the sense that they are having to adapt to new and different ways of delivering the curriculum – a factor borne out by Smith *et al.* (2008a and 2008b) who report a lack of teachers’ awareness about the existence of technologies such as wikis and social networking tools. PH, SPLA, PC and SAH all gave similar responses and commented to the effect that age can be factor, but not necessarily, and all gave examples of mature colleagues they knew who were extremely competent with ICT.

### **3.5 Barriers and Enablers**

The final question posed to the respondents was: ‘*What do you think are the main barriers and enablers to ICT skills development and practice?*’ Research has consistently reported time as a barrier, both in terms of finding time for staff CPD and finding time to either explore software and hardware independently or revisit and consolidate skills (see: Adam, 2007; Becta, 2008b; Smith *et al.*, 2008b; Somekh *et al.*, 2007; Thomas and Stratton, 2006). Time was identified as a barrier by half of the respondents. PH said that finding the time to develop staff skills was ‘the main barrier’. PC felt that time was ‘something we don’t have very much of’ and SAH cited time, but in relation to constraints in providing CPD and having time for self-development. SPLA felt that the main barrier in his Local Authority were ‘people’ and this was defined in terms of whether they willing or not to embrace change and ‘move on.’ PLA on the other hand felt that a lack of pressure from Ofsted to focus on ICT provision was also a barrier insofar as this contributed to limiting the scope and range of ICT.

In terms of enablers, PH felt that sharing school-wide expectations with staff acted as an enabler, for example the notion that reports and timetables should be shared electronically. PIH didn’t offer any opinion on the barriers he confronted. Conversely, he was able to cite money as an enabler because he had inherited a ‘huge under-spend’ which allowed him the opportunity to ‘do things’ which he wouldn’t otherwise have been able to do, such as freeing up staff to be able to undertake ICT training.

## **4. DISCUSSION**

Although all respondents reported that INSET was taking place in their setting and that this training was frequently tailored to match the needs of staff, there still remains the question as to why some teachers still lack basic ICT skills. If the significance of this is considered in the context of Rogers’ (2003) diffusion of innovations theory – which concerns the process of how people adopt or reject technology – then there may be a way of explaining why this situation exists. Rogers (2003)

acknowledges that those who are late adopters of technology tend to be cynical about change and innovation and will only embrace it when they feel it is safe to do so and that once an individual has tried an innovation they then make the decision to adopt or reject it. Those respondents (SAH and PLA) who were carrying out ICT audits included questions on basic skills indicating that there were teachers in their setting who were late adopters which would suggest that along with acquiring the necessary skills the benefits of such training for these staff would need to be observable (Rogers, 2003). Most respondents reported a wide range of skills within their workforces and although those more skilled were able to disseminate their expertise and knowledge, it is not clear what impact this had on ICT practice in general, or ways in which the range of teachers' ICT skills were broadened. There was a general consensus among the respondents that newly trained teachers are better skilled than longer serving teachers and although there was acknowledgement that older members of the workforce could be highly skilled, it is evident that they would need to be, in Rogers' (2003) terms, innovators or early adopters. Research would suggest (Adam, 2007; Guo *et al.*, 2008; Hunt, 2002; Rogers, 2003) that a person's age is not a factor in terms of the ability to engage effectively with ICT. The key, arguably, is innovativeness in the sense that it 'is the degree to which an individual . . . is relatively earlier in adopting new ideas than other members of a system' (Rogers, 2003, p. 22). In light of this, and despite the many barriers and enablers mentioned during the interviews, the most pertinent response, perhaps, comes from SPLA who cited 'people' as being the main factor in terms of whether a workforce is able to 'move on' or not

Respondents during the interviews were subsequently questioned concerning the exchange of knowledge between pupils and teachers and were asked whether they would ever consider using pupils as a resource in terms of empowering pupils to train teachers. Although this question was not part of the scripted interview, some responses are briefly touched upon here. SAH felt that pupils would fully embrace this role and that resistance would only come from teachers who felt threatened due to their own lack of confidence in ICT. SPLA and PLA both indicated that this process of engagement whereby a student offers advice or support was quite natural, particularly in a situation where a teacher was experiencing difficulty. Even in Key Stage 1, PC said that allowing pupils to share their knowledge had helped trainee teachers to troubleshoot problems when using the interactive whiteboard.

Some teachers feel that their status is threatened because they find themselves in a situation where the pupil is more skilled and knowledgeable than they are (Condie *et al.*, 2005 and 2007; Ofsted, 2009), although actively seeking advice from pupils is promoted as being beneficial in 'building relationships and breaking down barriers' (Cardinal Newman Catholic School and Brighton and Hove LA, 2006, p.2). As Hennessy *et al.* (2005) point out, ICT can provide a catalyst in terms of encouraging pupils and teachers to work together in new ways. This partnership not only facilitates teacher-pupil discussion, but fosters a climate which encourages 'exploration, analysis and reflection' as well as providing positive interaction, feedback and assistance (p. 285). Developing such partnerships may also address the issue raised by Ofsted (2009) that higher attaining pupils need to be engaged in order to avoid underachievement.

## 5. CONCLUSION AND RECOMMENDATIONS

This study was limited in the sense that the time scales imposed by Becta did not allow a more extensive number of interviews to take place. Although those interviewed constitute the overall makeup of the teaching workforce, further interviews with Secondary ICT Heads of Department, might, for example, have been useful. Although the respondents chosen represent both rural and inner city areas, and are typical of most UK schools, this research does not present the issues or problems faced in schools which may be judged by Ofsted to be failing or in special measures. What does emerge quite strongly from this study, however, is that barriers to the use of ICT involve a lack of teacher awareness about what technologies are available and how they can be used to support the delivery of the curriculum. If teachers are not able to implement and use the resources they already have available to them, then time and training would appear to be the main factors in preventing this happening. Time not just to locate and learn how to use these resources, but time to be shown, and practice, how they can be used in relevant ways to support subject teaching. In particular, evidence from the literature and the case study interviews suggests that the successful aspects of CPD involve face to face training which is tailored to both teachers' individual needs, their setting and the technologies available to them.

If the United Kingdom is to maintain its status as one of the world leaders in the use of technology for learning and teaching, then the change of government, the subsequent demise of Becta, the withdrawal of £50m funding for the *Harnessing Technology strategy* and the scrapping of many of the Building Schools for the Future [BSF] projects will almost certainly have an impact. Not just in terms of being able to ensure that an e-confident system is in place, but also in ensuring that the areas and gaps in the skills of the workforce are addressed. If the journey towards an e-mature workforce is to continue, then CPD will need to continue to play an important role and, in particular, this will mean meeting the training needs of the workforce in order to expand their breadth and range of skills. This will also mean employing methods of CPD considered to be most effective by teachers as well as systematically auditing teachers' ICT skills with a view to identifying and addressing gaps in knowledge and areas of weakness, but in a meaningful way in which teachers are able to observe the benefits of their training.

With regard to new and emerging technologies, greater collaboration may be needed between pupils and teachers to facilitate the development of teaching and learning in this area. However, a fine balance will need to be maintained between the perceived awareness of the relevance of new and existing practice, sufficient resources and ease of access as well as ensuring that teachers are ready, prepared and willing to engage with new ways of working.

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