

# Escalating the use of Web 2.0 Technology in Secondary Schools in the United Kingdom: Barriers and Enablers Beyond Teacher Training

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**Abstract:** This paper reports on research that took place at Nottingham Trent University (NTU) and Sheffield Hallam University (SHU), United Kingdom, over two years. The project formed the basis of an iterative, interpretive, action research study focussing on a particular set of participants – trainee teachers. The insights gained from the initial cycle fed into planning the second cycle, for which the action plan was modified and the research process repeated (Zuber-Skerritt 1992). The research project focuses on the use of Web 2.0 technology, specifically web logs, (or blogs) with trainee teachers, both during their university programme and during the first year of teaching as full-time newly qualified teachers. The purpose of this research was to add to a developing body of knowledge identifying whether technology used by trainee teachers during their training course can be cascaded into their practice once qualified. Participants from the two collaborating universities were introduced to blogs and blogging during their time at university, and encouraged to use it for themselves, and to also think about how it could be used in their own classrooms when they were teaching. Questionnaires were used to ascertain their thoughts on the use of blogs during training, and these were followed up with interviews with a number of the trainees to determine the cascading of this technology, once they had become newly qualified teachers (NQTs) and were teaching in schools. These interviews explored the reasons for enabling or inhibiting the use of blogs in their teaching in school. This paper presents the findings of the research and discusses the enablers and inhibitors that were identified in the light of current research findings. The research supports the view that developing innovative use of technology in the classroom is complex and experiences during training are not always transferred into practice.

**Keywords:** pre-service teacher education; secondary school teachers; technology uses in education; teaching methods, weblogs, blogs

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## 1. Introduction

Developments in Web 2.0 technology have seen an increased usage in secondary education, which is reflected in teacher training courses across Europe. At Nottingham Trent University (NTU) and Sheffield Hallam University (SHU) in the United Kingdom (UK), research has taken place over the last two years in the use of Web 2.0 technology in Initial Teacher Education courses. This paper focuses on how Web 2.0 technology, specifically web logs (blogs), are developed as a learning and teaching tool within secondary teacher education, and how this is cascaded into secondary schools. The research which was undertaken identifies the enablers and barriers to trainee teachers with respect to their use of Web 2.0 technology in their transition into full-time employment as newly qualified teachers (NQTs).

The speed of change in technology within education across Europe means that it is essential for trainee teachers to be familiar with the latest technology as a means for enhancing their own teaching and learning skills and those of their pupils. Clear links are established between teacher training and information communications technology (ICT) across Europe in a report by Pelgrum and Doornekamp (2009). The report, commissioned by the European Commission (EC), indicates that of the 28 European countries that took part in the report, 78% recognised that ICT in teacher training has a 'high to medium' need of monitoring (Pelgrum & Doornekamp 2009). The report further indicates that of the 28 countries, 90% regard pedagogical support for teachers as being of a 'high to medium need'. The figure was similar for pedagogical ICT competencies of trainee teachers, although a 'high need' was significantly increased for trainee teachers (ibid 2009, p 54). One country representative in the report is quoted as stating 'We want all teachers to display a full repertoire of pedagogical skills with technology' (ibid, 2009, p 41).

The trainees at NTU and SHU who took part in the research reported in this paper were all on a one year Post Graduate Certificate in Education (PGCE) course for trainee teachers (Europe = Second Cycle) working in the secondary education phase (age 11-18). The PGCE courses at both universities follow a similar pattern, both

being one-year courses involving time in secondary schools as well as periods in university. In the first term the trainee teachers spend approximately six weeks in university followed by approximately seven weeks in a secondary school setting. The trainees then return to university in the second term for a further seven to eight weeks, followed by approximately thirteen weeks in a different secondary school setting before completing the course. The research reported in this article reflects two phases. Phase one took place during the PGCE one year course. Phase two took place when the trainees had finished their PGCE and were working as full-time NQTs in secondary schools.

Blogs are described as a 'web application which contains periodic time stamped posts automatically arranged in a chronological order' (Mason & Rennie 2006). They have become widely used across the internet as a tool, partially because of their accessibility, and partially because of their ease of use, allowing non-technical people to contribute to websites (Hramiak et al. 2009).

Using blogs as an embedded part of teacher training enables trainee teachers to understand the wider implications of Web 2.0 technologies within a broad learning context. The practical uses of blogs during teacher training is far more powerful as an introduction to the tool than merely reading about it in the literature. Hammond et al indicate that the introduction of technologies during teacher training enables trainee teachers to develop an understanding of related pedagogy (Hammond et al. 2009). Trainee teachers also need opportunity to develop confidence that the use of this technology will 'support the achievement of higher level goals' (Gaffney 2010).

## **2. Literature review**

There are mixed findings reported by researchers on the use of Web 2.0 technologies in teacher education. For example, Divintini et al report limited use of blogs by teacher trainees (Divintini et al. 2005) and research undertaken with dyslexia and trainee teachers, found that blogging could be time consuming and question its value (Oti & Clarke 2007). Martindale and Wiley (2005) quote millions of people using blogs all over the world but indicate limited success when using blogs for educational purposes, (Beldarrain 2006; Martindale & Wiley 2005).

However, researchers such as Bonk and Zhang (2006), and Hramiak et al (2009) report success with the use of Web 2.0 technologies and trainee teachers. Larose et al (2009) argue that practices observed by trainees during training might optimise the chances of these future teachers using technology in their own classrooms (Larose et al. 2009). Reports in the educational press have also indicated that there may be some positive resistance to the use of e-learning and associated technology with teacher trainees by academics, the latter being reluctant to adopt technology in their sessions with trainees (Attwood 2009).

Research findings align the successful integration of technologies in the classroom with appropriate pedagogy. For example Mukama and Andersson found the need to develop school based curricula and appropriate pedagogy to allow trainee teachers time to develop criticality with respect to new ICT based tools (Mukama & Andersson 2007). A study by Hammond et al (2009) found that a pedagogical rationale was an important success factor when trainee teachers used new technologies and could result in an inclination to use ICT, or a propensity to see its value in the classroom (Hammond et al. 2009). Hammond et al's study also resonates with the findings of Davies et al (2008) indicating that a more ecological approach may be at play with respect to the use of information technology by teachers in classrooms, suggesting that the interaction of the trainee and the environment is pivotal (Davis et al. 2008; Galan & Blanco 2004). Also Granberg (2009) found that where teachers share a pedagogical vision, then the difficulties of integrating information technology into courses can be overcome. In Granberg's study, in which trainee teachers were required to use information technology as part of their teaching and then to cascade this use, it was found that, in the absence of formal structures for pedagogical discussions, teachers could experience barriers when trying to develop ICT supported methods of teaching and learning (Granberg 2009).

Beyond teacher training, researchers report more confident results in the use of blogs in education. For example Beldarrain (2006) reports success with fostering student interaction on-line using blogs. Kim, in completing a literature review of barriers to successfully integrating ICT in teaching, concluded that 'It is worth attempting to implement a blog in educational fields' (Kim 2008). Other researchers have analysed the dimensions of blogs in relation to successful use in some university and college contexts, and the role they

might play in education and professional contexts (Oravec 2003). Recent reports from Australia indicate a use of blogs as part of a range of tools used to transform a face to face course at masters level to one that was predominantly online in order to improve student communication during placement (Hoven 2006), while Instone reported positively on the use of multi-participant blogs as a component of a professional development program for managers (Instone 2005).

The aims of the research reported in this paper was to add to this growing body of knowledge, and to identify whether technology used by trainee teachers during their training course, supported by appropriate pedagogy, was cascaded into their own practice once they had qualified. The research also identified the enablers and inhibitors once the trainees were in their first year of teaching.

### 3. Methodology and methods

The methodology used for this research was action research as discussed by Carr and Kemmis, Kolb, Lewin, Whitehead and McNiff and Zuber-Skerritt (Carr & Kemmis 1986; Kolb 1984; Lewin 1946; Whitehead & McNiff 2006; Zuber-Skerritt 1992). Action research theorists adopt a methodical, iterative approach to research, embracing a hierarchical cycle of problem identification, action planning, implementation, evaluation, and reflection. The insights gained from the initial cycle feed into planning the second cycle, for which the action plan is modified and the research process repeated. This theory has been applied to Higher Education by Zuber-Skerritt (1992) whereby the researcher is considered to be involved in the process:

*'The ultimate aim [of action research] should be to improve practice in a systematic way and, if warranted, to suggest and make changes to the environment, context or conditions in which that practice takes place, and which impede desirable improvement and effective future development.'* (Zuber-Skerritt 1992).

The acknowledged founder of action research, Lewin, developed the basic principles and recognised the participatory nature of action research in relation to social change. Masters (1995) uses McKernan (1988) in her discussion in which she argues that action research as a method of inquiry has evolved and is rooted in scientific methodology (McKernan 1988). Action research produces both knowledge and new ways of 'understanding practice' (Noffke & Somekh 2009).

Two phases of research took place reflecting the cyclical nature of action research. The methods used for each stage are reported below. Throughout the research the authors wanted to embrace the use of new technologies and provide opportunity for trainee teachers to develop skills in using blogs, identify where the use of this technology would enhance the experience of their pupils, and be confident in using blogs in teaching and learning, supported by the trainee teachers' developing understanding of appropriate pedagogy. The authors believed it was important to introduce the technology methodically and reflectively to encourage similar processes for their trainee teachers to follow once they were qualified teachers. Drawing on the experiences of other researchers discussed in the literature survey the authors ensured opportunity for criticality, a shared pedagogy, as well as support and encouragement from university tutors, school based mentors and their peer group; these are all cited by McNiff and Whitehead as essential for successful action research. (McNiff & Whitehead 2009).

A predominantly qualitative and interpretive approach was taken for this study (Bogdan & Biklen 1998). The research represents small scale research investigating a particular set of trainees at different institutions on similar training courses; the Post Graduate Certificate of Education. The collaboration between NTU and SHU focussed on collating similar data sets (Groom & Maunonen-Eskelinen 2006) to identify how the blogs supported reflective practice and as a classroom resource (phase one) and then investigated its cascading into schools (phase two). The use of multiple sources of evidence, gained from using different methods to collect the data provided triangulation of data and added rigour to the conclusions drawn from the data (Cohen et al. 2007).

The use of blogs at both universities by the trainee teachers in the two respective cohorts for the duration of their time on the PGCE course was mandatory. There were eighteen trainees in the SHU cohort and fifteen trainees in the NTU cohort, totalling 33. Both cohorts comprised of male and female teacher trainees with an age range from 21 to 55. All had access to ICT facilities throughout their university course including the blog tool. The blog tool was different at each institution: at SHU this was part of their Virtual Learning Environment

(BlackBoard®), while at NTU the tool used was external to the university’s provision, freely available on the Internet (LiveJournal).

In phase one, an analysis was undertaken by the two universities to determine attitudes and perceptions of blogging as a tool for reflective practice which developed into the use of blogs as a resource in the secondary school classroom (Hramiak et al. 2008). The data collection for this analysis was via questionnaires. In addition, an evaluation and review of existing practice within the two courses at NTU and SHU in this area of teacher training was undertaken. Trainees were introduced to the pedagogy of using blogs in secondary schools and encouraged to identify a range of activities in secondary education where blogs could enhance the curriculum, both within and outside the classroom. At NTU observations of the use of blogs while the trainees were teaching, and their evidence of using blogs as a classroom resource was recorded.

In phase two a total of five trainees from the SHU cohort and five trainees from the NTU cohort, now qualified teachers, were interviewed. These participants were selected to provide a representative sample based on age and gender. The interviews followed open questions to identify if and how trainees were using blogs in their own teaching in schools now they were qualified teachers, or if they had included the use of blogs in their planning for the academic year. Questions were also used to ascertain what the respondents perceived the barriers to be if they were not cascading the use of blogs into their teaching. Where possible, interviews were conducted face to face, this depended on availability of trainees at the different institutions. Where face to face interviews were not possible the participants were interviewed via the telephone. Interviews were conducted during the second term of the academic year in which the respondents were fully qualified teachers. At NTU, an invitation was also sent to the remainder of the phase one cohort resulting in an additional seven participants completing an on-line questionnaire which had been designed to reflect the interview questions and which also provided opportunity for additional comments and data. This represented a total of seventeen respondents, that is, 50% from phase one who participated in phase two.

**Table 1:** A summation of the methodology for each phase is indicated below:

University	Phase 1 (as part of taught University Course)		Phase 2 (students from phase one are now newly qualified teachers)	
	Participants	Data collected	Participants	Data collected
NTU	15	Questionnaire + observations of teaching	5	Interviews
			7	On-line questionnaire
SHU	18	Questionnaire	5	Interviews
NTU and SHU	Analysis undertaken to determine attitudes and perceptions of blogging by trainee teachers. Evaluation and review of existing practice within the PGCE at each University.			

The data collected from phase two was analysed looking at similarities and differences between the trainees from NTU and SHU. Analysis also took place to provide evidence of enablers and inhibitors to cascading the use of blogs into the newly qualified teachers’ professional practice. These findings are described in the next section of this paper.

## 4. Findings

The findings from the study are described in detail by phase, in this section following.

### 4.1 Reflections on findings from phase 1

As stated above, the use of blogs was mandatory for all the trainee teachers in phase one. During the first term of the course the trainee teachers at both universities were introduced to using blogs, both as a reflective tool as part of their professional development (Hramiak et al. 2009), and as a classroom tool supported by pedagogy (Hammond et al. 2009). The teacher trainees were encouraged, prior to their first secondary school experience, to identify possible uses of blogs in the secondary curriculum and to build this into their developing repertoire of learning and teaching methods. At the end of the first school placement a review took place with the trainees; the results of this were drawn on to inform changes in their training, prior to their

second placement, thus following the cyclical nature of action research. In the second term further discussion on using blogs in the classroom, and opportunities to share their experiences from their first school experience, again supported by pedagogy, took place. In addition the secondary school curriculum was explored to identify appropriate opportunities for using blogs in the classroom and for out of school learning. During this second term trainees were encouraged to cascade their use of blogs into their teaching and share their experience with their peers. Observations of the trainees on teaching practice by university tutors reported observing the use of blogs in a variety of ways, such as a reflective tool by the trainee teacher, and within the classroom such as group reflections on the development of projects and for recording a field trip.

By the completion of their course the trainee teachers had developed blogs for reflection as part of their professional development requirement and had examples of using blogs to support their teaching and classroom practice. This latter usage was predominately in their second placement where their classroom experience was more developed and the trainee teachers were more confident with pedagogy, thus ensuring the blog tool was a resource to support learning and teaching rather than used as a tool driving the learning. At the end of their PGCE course qualitative data indicated that the teacher trainees were planning to develop the use of blogs in their teaching and saw Web 2.0 technologies as a way of engaging secondary school pupils.

In general class discussions between trainees during university seminars it was noted that all of the trainee teachers found the engagement of their pupils increased when they used blogs as an appropriate tool in their classrooms. Some reported that the motivation of their pupils also increased. At NTU a discussion of the use of blogs by the trainee teachers aligned to Blooms' taxonomy identified examples of higher levels of achievement when they had used the blogs in their classrooms. The trainees reported that this did require carefully planning but the additional time spent planning the use of this tool was:

*'definitely worth it ... seeing the pupils' motivation and achievement increased resulted in greater engagement. Being able to use different media in the blogs also helped pupils with learning difficulties to produce a higher level of work'.*

This approach to cascading the use of blogs into their teaching as part of their university training, supported by experienced tutors and developed over two years, proved successful. At NTU mentors in schools who were experienced teachers supporting the teacher trainees while on placement, were also asked to encourage the use of this technology while the trainee teachers were on placement. These mentors reported that the trainee teachers were encouraged to lead staff development events in using this technology, providing further evidence of successful cascading during their training. Trainees therefore completed their PGCE course with a portfolio of uses of blogs supported by their personal experiences and knowledge of pedagogy.

#### **4.2 Phase 2: Cascading the blogs into classroom practice**

Findings from the data indicated that while the respondents continued to reflect on their developing professional practice only one ex-trainee from each university was using a blogging tool for this purpose at the time the research was conducted. The remainder had changed to annotating their lesson plans, word processing, or handwriting their reflections.

Forty-nine per cent of ex-trainees from each cohort had utilised blogs within their classrooms; in each case this was a different ex-trainee to those using the blogs for reflection. Sixty seven per cent of the respondents were intending to develop the use of blogs within their classroom practice in the next twelve months. In addition fifty per cent of the respondents indicated that they had either trained colleagues in how to use blogs, or had been asked to run a training session within their school.

When asked why the blogs in their classrooms a variety of barriers were identified: pupils lacked the skills for this technology; there was insufficient time in the curriculum to teach them the necessary skills; the school's virtual learning environment did not support a blog tool; there was a lack of support to introduce new technologies; there were problems accessing blogging sites due to their school internet firewalls; the school policy relating to e-safety did not support the use of blogs.

Comments from respondents included:

*'We have discussed briefly about using blogs in the classroom but because of firewall settings it will not be easy including it in our planning as this might not work'.*

Another respondent commented that

*'[...]no plans to use it with the pupils as the VLE [virtual learning environment] doesn't allow 'communications' such as blogging due to bullying, and most staff don't use it' (the VLE)*

Another reported

*'We have only just got a VLE and there is a blog on it but I don't use it'.*

Respondents also commented on the lack of support with thirty per cent commenting on the level of support in using blogs during their teacher training year (phase one), but did not have the same level of support now they were qualified (phase two). These respondents stated that they were too inexperienced and new to their respective schools to start up a group with other interested colleagues where they could have established a mutual support group.

*'...there was no cascading or training on blogs with colleagues.'*

There were some positive responses. For example, one of the teachers who was using blogs in teaching was particularly positive, and had been identified as the digital champion for the school. He was using blogs for his Key Stage four and five classes (age fourteen to eighteen) and had built this into formative assessment thus encouraging his pupils to develop their use of blogs. He reported that he was teaching them to reflect on project development through their blogs. This teacher had also used blogs with some Key Stage three (age twelve to thirteen) children and commented that the blogs were engaging the children:

*'...the kids love it, it's sexing up the curriculum'*

## **5. Analysis and discussion**

The analysis suggests that there were several factors which influenced the teachers in cascading their use of blogs into their teaching once they had completed their PGCE, some of which reflects the research of others as discussed below.

### **5.1 Barriers to cascading the use of blogs into teaching**

Research by Stuart et al (2009) reports that the ICT competence of school leaders may determine whether or not ICT is championed in a school (Stuart et al. 2009). This aligns to comments by forty five per cent of the respondents in phase two of this research, which included a perceived lack of support and vision by managers of the schools they were working in which is discussed further in 5.3 below. The data analysis indicated that a more positive culture to the use of innovative technologies would help new teachers to cascade this into their teaching.

Bingimlas (2009) draws on existing literature including Grabe and Grabe (2007) to identify barriers to the integration of ICT in education, (Bingimlas 2009; Grabe & Grabe 2007). From the literature he identifies barriers at teacher level as a lack of teacher confidence, resistance to change and negative attitudes; and barriers at school level as lack of time, lack of accessibility and lack of effective training and lack of technical support. Not all of Bingimlas' identified barriers at teacher level would be fully relevant to the respondents in this research as they all experienced the use of blogs as part of their PGCE course both in University and while on school placement. However, there were comments from the respondents relating to perceived negative attitudes in school being a barrier to cascading. Lack of time and accessibility to blog software were identified in this research and thus correlate with Bingimlas; lack of training and technical support were not reported. This may be because the respondents in this research were trainee ICT teachers who were familiar with the technology prior to entering teaching.

Hodgkinson-Williams et al reported that the 'community' aspect of teachers (both virtual and physical) might affect the take up of ICT in schools (Hodgkinson-Williams et al. 2008). Findings in this research indicate that the student teachers supported each other through communities of practice while at University. However, the data indicated that once they became full-time teachers they did not continue with existing communities and lacked confidence to build a new community of practice in the schools where they were employed:

*'If there was a group of us in school pushing to use the blogs and supporting each other it might take off'.*

This may be an area for further research because it raises questions of why the NQTs only looked to those within their own school for support when new technologies provide opportunities of setting up or joining existing communities of practice across the world.

Other studies have shown that a more organic approach to ICT teacher training is required to support the evolution of a teacher's classroom. This type of approach supports a more ecological view of the diffusion of ICT innovations in education (Davis et al. 2008). A more organic type of training was arguably experienced by the participants of this study, in that they learnt in a gradual way over time for the duration of their course from mentors, tutors, and from each other. This organic approach, however, does not seem to have had the positive effect that Davies et al's (2008) study would imply. It may be that the 'ecological climate' of schools, once the respondents were teaching in them as qualified teachers, was a much harsher climate, with less facilities and time, thus denying them the opportunities to reflect and engage with new technologies in the same way they did when they were trainee teachers.

In a recent study by Sorebo et al (2009) self determination theory was used to try to predict whether or not teachers would continue with e-learning in their own practice. The results showed that basic psychological needs and intrinsic motivation were useful indicators (Sorebo et al. 2009). This reflects findings in this research; respondents all indicated that they were motivated to use web blogs and other new technologies in their teaching. Motivation would therefore be included in the enablers.

In a study by Kilbourn and Alvarez, (2008) trainee teachers found it difficult to integrate information technology critically into their classrooms (Kilbourne & Alvarez 2008). This is something that has arguably, in part, been borne out by this study. This is also reflected by Mukama & Andersson's study, which indicated that teachers needed time to become able to use ICT critically in their practice (Mukama & Andersson 2007). In the research reported in this paper the respondents stated that they had the time and support to be critical when introducing innovations while trainee teachers, but lacked this time once they became qualified teachers.

Granberg's study (2009) stressed the need for an attitude of preparedness for change with an emphasis on the learning process. This was borne out by the data in the study reported here which found that the participants could not overcome the barriers of time for introducing new technologies.

The respondents also reported that access to blogging software was a barrier to cascading this use into their professional role. This had not been reported during their PGCE course. Hammond et al (2009), Ofsted (2009), Pelgrum and Doornekamp (2009) and Gaffney (2010) discuss access as a potential barrier in terms of access to technology. Data from this research indicated access to blog software was a barrier to some. Access was reported as being blocked by internet firewalls set up internally by rigorous systems required by school managers, externally by local authority broadband consortiums and by restrictions to the school virtual learning platform by managers keen only to use the school virtual learning platform which did not have a blog tool.

## **5.2 Enablers to cascading the use of blogs into teaching**

The British Educational and Communications Technology Agency, Becta, (2003) identify five enablers as being necessary to provide good learning opportunities in secondary schools: ICT resources, school leadership, ICT leadership, general teaching, and ICT teaching (British Educational and Communications Technology Agency 2003). However, Becta makes the point that these enablers are 'not sufficient in themselves to provide good ICT learning opportunities'. A report produced by the UK's Office for Standards in Education (Ofsted) based on evidence of school inspections in England from 2005-2008 on the importance of ICT in primary and secondary schools (2009) also comment on the importance of the vision of school leaders for the place of ICT in learning, infrastructure, resources and staff training, thus suggesting that these are significant in enabling the good learning opportunities in schools (Office for Standards in Educaiton 2009).

The data in the research reported in this paper identified that the main enabler to the cascading of blogs into classroom practice was the experience of the respondents from their PGCE experiences. All the respondents reported confidence in using blogs and all were able to cite examples of using blogs in their teaching during their PGCE. All respondents were also able to explain the pedagogy of using blogs in their teaching, were able to engage critically in discussing the use of blogs in their classrooms, and understood the importance of the

appropriateness and relevance of choosing to use blogging to engage their pupils and enhance the delivery of the curriculum. However, for the majority this confidence and experience gained in university had not yet been harnessed in their NQT year.

Those who had support from colleagues in their school reported that they had utilised blogs and were encouraged by the engagement of their pupils in developing this usage and also in introducing other Web 2.0 technologies. One respondent stated:

*'I used a blog tool for the [GCSE] group to record the development of their project. The group enjoyed this so much that I am going to introduce a Wiki to develop group project work'.*

Time was both an inhibitor and an enabler. Examples cited were that while they were trainee teachers, time was an enabler, that is they had sufficient time to use the blogs and identify where in the curriculum blogs could be used to engage pupils and enhance their learning. Once they had qualified and become NQTs, however, the lack of time meant that time became an inhibitor. One respondent commented:

*'In a 50-60 hour week, sometimes 80 hours, it was the last thing [I] considered doing'.*

## **6. Conclusion**

In the literature review the authors referred to Hammond et al's (2009) findings that the knowledge of how and when to use technology in the classroom, together with an understanding of the pedagogy, provided teacher trainees with an inclination to use ICT, or a propensity to see its value in the classroom (Hammond et al. 2009). While the teacher trainees in the study reported in this paper were confident in the use of blogs in the classroom, they knew where the technology could be used to enhance the secondary curriculum, and had a good understanding of the pedagogy, there were additional inhibitors once they were in schools without the support and encouragement of their university tutors, mentors and peers.

Reference is also made earlier to a study by Mukama and Andersson, (2007) which indicated the need to provide teachers with appropriate pedagogy and time to develop criticality with respect to the new ICT based tools. In the research reported in this paper the teachers had been provided with appropriate pedagogy and had been encouraged to develop criticality, but other issues such as time, access and support became greater inhibitors in the school environment. There is also resonance with Van Schie (1997) that 'the dissemination of knowledge and experience of the use of ICT however amongst all stakeholder in the educational system is relatively slow' (Van Schie 1997).

While the media suggests a proliferation of new technologies are being used in secondary schools, this research and that of others cited in this paper would suggest a different picture. This research indicates that it is important that teacher trainees are introduced to using new technologies underpinned by an understanding of pedagogy. Blogs are a way forward for this, providing, as they do, a useful tool to support reflection, share experiences and increase interaction amongst participants. The research also indicates that school managers should be encouraged to embrace the enthusiasm and skills of NQTs who often have high level skills, motivation, confidence, criticality, knowledge and understanding of when and how to use new technologies in the classroom. These recommendations reflect Gaffney's findings; the 'need to ensure the use of [technological] tools is pedagogically sound and strategically planned' (Gaffney 2010).

The school culture also needs to be open to embedding new technologies within the curriculum. Senior managers may want to encourage newly qualified teachers to offer workshops and support to cascade new technologies and the associated pedagogy into their school curriculum. This again is reflected in Gaffney's report (2010, 12) 'whole-school valuing of digital technologies and associated curriculum resources, especially by the school executive, makes a difference' and also correlates with Becta and Ofsted findings set out in the previous section. Higher education institutions may want to encourage teacher training students to join existing support networks, or set up their own, to provide support for using technologies innovatively once qualified. An example of this would be the Vital site, funded by the Department for Education, which provides a global community for teachers, and trainee teachers, to share and collaborate in the use of new technologies ([www.vital.ac.uk](http://www.vital.ac.uk)).

As more schools embrace new technologies this research should provide answers to potential barriers and inhibitors. A more organic approach to using technology with and for teacher development may be more

successful for NQTs. This research indicates that early professional development should be ongoing and assumptions about new teachers as champions of the technology with which they are familiar may be over optimistic. Also, if we are to draw on Web 2.0 technologies such as blogs to enhance the secondary curriculum and engage learners, (in the ways described above) we must encourage school managers to consider how to reduce the barriers to using the technology, provide greater opportunities for the use of sharing of experiences of using new technologies by teachers, provide the time for teachers to develop these new technologies within their classrooms and encourage teachers to work more collaboratively.

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