

**Implementing Web 2.0 in Secondary Schools:
Impacts, Barriers and Issues**

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Executive summary

This report **presents evidence relating to Web 2.0 practices** as they are currently realised in the educational community at Key Stages 3 and 4. It is one of several reports on Web 2.0 that can be accessed from the Becta website at:

http://partners.becta.org.uk/index.php?section=rh&catcode=_re_rp_02&rid=14543

This report aims to:

- **evaluate the impact on learning and teaching of Web 2.0** and the opportunities presented by its use
- **investigate barriers and challenges to implementation** by evaluating experiences across local authorities
- examine teachers' observations of **impact on learners**, and on the **processes of innovation** at individual and institutional levels
- highlight choices, opportunities and visions presented by Web 2.0 in education and draws out **implications for current policy**.

The report draws upon evidence from multiple sources: field studies of 27 schools across the country; guided surveys of 2,600 school students; 100 interviews and 206 online surveys conducted with managers, teachers and technical staff in these schools; online surveys of the views of 96 parents; interviews held with 18 individual innovators in the field of Web 2.0 in education; and interviews with nine regional managers responsible for implementation of ICT at national level.

Two rather different approaches to Web 2.0 were encountered:

- For some, implementation was primarily about adopting Web 2.0 tools
- For others, it was about practice resonating with the Web 2.0 ethos of establishing and sustaining collaborative learning communities.

Web 2.0 technologies in action

The project looked closely at the implementation of those Web 2.0 tools most prevalent among learners at home and at participating innovating schools: social networking, blogs, wikis, conversational arenas and media sharing (including podcasting). Unless otherwise stated, all statistics refer to the full data set.

- **Social networking.** Social networking using popular commercial applications such as Bebo or Facebook (on which 74% of the school students surveyed had accounts) was very rare in schools. Only 7.3% of teachers reported having used a social networking site in lessons or

lesson planning (whereas 45% had a social networking account for personal use).

- **Blogs.** Many teachers used personal blogs, but 48% thought it was not important for students to keep blogs in school. Some teachers used blogs to record information, opinion and ideas, and for sharing good practice among colleagues and some of these were available on the open internet. Some teachers used blogs with students, setting open-ended tasks with structured support provided through the blog, with the goal of encouraging enquiry and empowerment. Blogs were found to be useful both for in-class activities and for extra-curricular activities such as debate, peer assessment and commenting on shared experiences.
- **Wikis.** Teachers were generally enthusiastic about the opportunities presented by wikis, with 46% believing that students should have the experience of building their own wiki encyclopaedia. Although examples of teachers editing wikis for schoolwork were comparatively few, 75.2% of teachers reported using a wiki – 32% had done so during lessons. Wikis were used with students for peer assessment, development of behaviour guidelines, and sharing knowledge and research. However, some teachers found that wikis were unsuitable as document repositories and were unable to cope with the conversational demand generated, and moved from wikis to linked discussion forums.
- **Discussion forums and online chat.** Discussion forums were perceived by a number of teachers to have significant potential for learning – provided activities were carefully structured and monitored. Where forums were used, they were normally ‘closed’, hosted within the protective environment of a school’s virtual learning environment (VLE). Discussion forums provided the means for supporting weaker students (through monitoring and additional, targeted prompts) and higher-ability students (through extension materials and activities). Nearly half of teachers felt competent or very competent with their use. However, only about 13% of teachers felt very competent with internet chat and instant messaging, and teachers were divided about the potential of these technologies for future use in the classroom.
- **Uploading and downloading material.** Three-quarters of teachers surveyed believed that students needed more experience of uploading and downloading materials. Some languages teachers made extensive use of ‘vokis’ (where an avatar on a website is used to replay a sound recording of a student). However, podcasting was only used experimentally or sporadically. Some teachers used video clips from YouTube, but general access to YouTube was blocked in all but two of participating schools.
- **What tools were absent?** Some Web 2.0 tools were absent in nearly all the schools that were surveyed. These were collaborative

editing/composition, recommender systems, syndication, and media manipulation and distribution. Where collaborative editing occurred, it was largely between teachers and students rather than between students; access to computer suites was reported as a constraint to this activity. Social bookmarking tools were only used by one innovator and one Web 2.0-innovating school.

Impact of 2.0 on teaching and learning

Student motivation and engagement were, for both teachers and innovators, the most powerful drivers behind using Web 2.0 tools for learning. Innovators tended to express a sense of continuity with existing practices rather than a radical departure from them.

Overall, the uses of Web 2.0 approaches that were encountered were exploratory rather than embedded, but four potential benefits to learning and teaching of using Web 2.0 to establish and sustain a participatory, collaborative and creative ethos of enquiry were found in the data, though in differing degrees:

- The first of these was stimulating **new modes of enquiry**. Enthusiasts often expressed their positive disposition in terms of the 'independence' of enquiry that Web 2.0 access offered; though this was tempered with an awareness that learners needed to be guided into acquiring this independence, particularly when students were tentative or even suspicious of using internet resources.
- The social internet affords new opportunities for **engaging in collaborative learning activities**. Activities grounded in communication (such as discussions, speaking and listening) can clearly be facilitated through technology, and 82% of teachers indicated that their students needed more experience of collaborative learning. Two-thirds of teachers thought that Web 2.0 tools could support such collaboration, although 41% of teachers had never used Web 2.0 to facilitate it. Perceived challenges included barriers presented by the examinations system and learners viewing Web 2.0 tools primarily as 'chat spaces'. However, some teachers had found that Web 2.0 technologies could encourage simultaneous, learner-directed discussions which extended beyond the lesson, and examples of these are presented in the main report and in the case studies that follow it.
- Some teachers emphasised **engaging with new literacies** as one of the experiences that Web 2.0 seemed to offer learners. Over two-thirds of teachers agreed with the statement: 'Assessment should shift from writing towards visual media.' Practitioners noted that Web 2.0 engaged many learners who were tentative contributors in class or who had special

needs, and supported learners' natural curiosity by enabling expression through different media and a sense of audience, providing access to further resources and the ability to gain confidence and skill in speaking and presenting.

- A small but significant group of innovating teachers saw **publication of content** as an important Web 2.0 area, and felt they had an important role in providing learners with the skills and confidence to do this. Publication was felt to enhance a learner's sense of ownership, engagement and awareness of audience, lending weight to peer assessment and to learning informally or outside the classroom. Learning platforms were the most common outlet for publication, through publishing presentations for use in lessons, engaging in writing competitions, building personal web spaces, and uploading images and text for peer assessment. Teachers were generally interested in publishing more of their students' work online, but felt more comfortable doing this within a learning platform or VLE.

Implementation: Barriers, tensions and facilitators

There was a generally high level of awareness and understanding among teachers of Web 2.0 technologies and their use by young people. While practically all teachers that were met were active internet users – 93% reported having used a search engine within the last 24 hours, active Web 2.0 users represented a minority.

- **Potential.** Of the teachers in the survey schools, 54% believed that 'Web 2.0 resources could support more effective collaborative learning', but many were unsure about the opportunities presented by Web 2.0 or felt they did not have enough information to decide. Some teachers were enthusiastic proponents: 59% believed that popular Web 2.0 resources should get more use in the classroom, but others were more concerned about issues such as time for familiarisation and planning, or problems of control and trust. Many teachers felt that curriculum and assessment pressures reduced their opportunities to introduce Web 2.0 approaches. More than a third (37.4%) of teachers believed adopting Web 2.0 resources would be very time-consuming, and teachers frequently (18.7%) or occasionally (47.0%) found that student use of the internet in class was hard for them to manage. Many teachers had concerns about being let down by technical failure, or even worse, removal of the facility due to rising costs/insufficient budgets.
- **E-safety, filtering and blocking.** Practitioners and regional broadband consortium (RBC) managers shared the belief that parents as well as schools must be engaged with e-safety in order for responsible behaviours to develop, and expressed concerns about the current level of parental engagement. Paradoxically (given that 58% of teachers surveyed wanted

tighter internet controls), many teachers reported frustration at being unable to access websites due to RBC/local authority and/or school filtering systems. Not all staff were clear about how to unblock sites. While many teachers and ICT co-ordinators felt local authority filtering to be overly stringent, the RBC view was clear: filtering is in place because schools and teachers want it. In addition to cyberbullying worries, practitioners also expressed concerns about the privacy/safety of passwords, the use of public forums and the possible traceability of children.

- **Access to technology was felt by teachers to be crucial for effective Web 2.0 use.** In some schools, barriers included insufficient access to computer suites (where ICT subject teaching predominates), insufficient levels of technical support (including specialist support for Web 2.0 tools) and/or insufficient bandwidth. The most active Web 2.0 schools had high levels of ICT resourcing, particularly in terms of staffing to support teachers as well as learners. Adequate bandwidth is important where schools need to access large files over the internet, and to run simulations and podcasting. Among the RBC leaders interviewed, all were looking to significantly expand bandwidth beyond current levels.
- **Other barriers to uptake include legal, content and portability issues.** Findings suggest most teachers have a lack of awareness of legal and copyright issues when using external resources. RBCs deal on schools' behalf with a number of issues related to copyright and intellectual property, and take positions aimed at facilitating schools' access to asset collections. Staff rarely raised issues of intellectual property rights and plagiarism in relation to the ideas and work of pupils, despite the relevance of these issues to collaborative activities. Transition and portability were a concern of RBC leaders and were being addressed through developments in single sign-on workspaces and authentication of users.
- **Innovation was most commonly identified as starting at the individual and local level,** though management support could greatly facilitate the embedding of change. However, staffing changes could have a major impact when innovators moved to new posts. Effective staff development opportunities, with support and time for innovation, play a crucial role in the process of Web 2.0 adoption, and 56% of teachers indicated that they would welcome more guidance in the use of Web 2.0 technologies.

Choices, opportunities and visions

Use of Web 2.0 requires practical choices: what platform should host the activity, and should this be on the open internet? How should good practice be disseminated beyond current users? Who leads technical implementation and support?

- **How large is a ‘walled garden’?** Nearly all the Web 2.0 schools did have some form of VLE, whether developed in-house or externally. For most schools, hosting Web 2.0 activity implied a walled garden approach with password-protected content, but a minority of Web 2.0-innovating schools enabled some or all of their Web 2.0 activities to be visible on the open internet – podcasts, in particular, benefited from wider publication. Nationally, some RBCs aim to replace the concept of a school-level walled garden with a much bolder and more extensive concept that will connect up to a million users (teachers, pupils and other stakeholders, including parents) in large-scale, protected learning communities while maintaining duty of care.
- **Local autonomy or regional community?** Schools have to choose how much autonomy to retain as regards implementation of the technical infrastructure needed for Web 2.0. In-house expertise, at its best, yielded tools which were more specific to the schools’ needs and more immediately responsive to problems (for example, immediately facilitating access to a blocked website or updating content). However, use of external services may be felt to offer a greater pool of functionalities and capabilities. Externally hosted VLEs solved many problems, but were sometimes felt to place a greater strain on bandwidth as pupils needed to upload and download resources. The need to moderate conversational arenas was also seen as a potential barrier, particularly in relation to staff time.
- **The perceived rigidity of the secondary school timetable** was viewed by managers and practitioners as a barrier to implementation. There was a perceived tension between requirements for assessment and adoption of Web 2.0 tools. Little mention was made of the formal assessment of work from Web 2.0 sources or where computer-supported collaboration has been involved.
- **For the local authority and RBC managers interviewed, Web 2.0 approaches were particularly seen as key to developing personalised, ‘anytime-anywhere’, independent learning.** Related to this was an awareness that students needed to be prepared for new experiences of the workplace and its technologies.

Implications for policy-makers

Policy-makers need to be aware that:

- Web 2.0 can be used to support learning and teaching by engaging students in more participatory learning

- Many innovating teachers feel that current curriculum and assessment structures inhibit and de-incentivise the creative use of Web 2.0 technologies
- The implications of new digital assessment and recording capabilities are still being explored, and issues of permanence, ownership, file access, storage of large files and data transfer between schools will need very careful consideration
- Web 2.0 raises significant issues in relation to the authority of knowledge, and highlights the importance of developing critical internet literacy
- Web 2.0 activity highlights the importance of schools taking responsibility to exercise a duty of care in relation to e-safety that extends beyond the school wall; schools need to support learners in becoming independent users, skilled navigators and critical interpreters of the internet
- Web 2.0 pedagogies flourished where the following were in place:
 - A reliable, resilient computer infrastructure with good access for teachers and students, sufficient bandwidth, hardware sustainability, and rapid, effective technical support
 - Clear vision and supportive leadership from management, in conjunction with targeted, effective staff development for all teachers (that covers both technical and pedagogical skills) and additional support for individual innovators
 - Flexible models of learning with Web 2.0 approaches embedded in the curriculum, both within and across subjects, coupled with support for student learning at home as well as school
 - Supportive leadership from managers who are sensitised to the opportunities of using Web 2.0 and who can enact an e-safety policy that provides protection while educating learners about responsible behaviour and critical literacy on the open internet.

These individual conditions were not rare in schools, but it was rare to find them all, with curriculum practices that had embedded Web 2.0 approaches, both in and out of school.

1 Context, methodology and authority of this report

1.1 An overview of the Web 2.0 project

The Becta research project on Web 2.0 technologies for learning at Key Stages 3 and 4 had five primary objectives:

- 1 To present an overview of current research into Web 2.0 and its potential uses in education.
- 2 To provide insight into learners' use of Web 2.0 both at home and at school.
- 3 To evaluate the impact on teaching and learning of Web 2.0 and opportunities presented by its use in education.
- 4 To investigate barriers and challenges to implementation by evaluating experiences across local authorities.
- 5 To identify e-safety and child protection issues surrounding the use of Web 2.0 and identify how these technologies can be used safely.

The present report is focused on the third and fourth of these objectives. In order to investigate these questions, the research team conducted in-depth investigations of 27 schools across the country, and also interviewed individual innovators within the field of Web 2.0 in education and regional managers responsible for the implementation of ICT at a national level. Furthermore, online surveys and focus groups were conducted with 2,600 learners at Key Stages 3 and 4, more than 100 interviews and 206 online surveys were conducted with teachers in these schools, and online surveys of a cross-section of parents were administered. The data from the project therefore presents a significant opportunity to gain detailed understanding of Web 2.0 as it is currently practised in the educational community, evaluate the challenges and opportunities presented by these practices, and to highlight areas where further development of Web 2.0 may be promising.

This report builds upon the framework established in the project's first report, *The Current Landscape – Opportunities, Challenges and Tensions* (see the first objective in the list above). That report constructed a taxonomy of activities for understanding Web 2.0 practices, highlighted some of the educational potential of Web 2.0, and provided a framework for understanding some of the systemic and technological challenges involved in implementation. Other reports have provided detailed analyses of learners' use of Web 2.0 both at home and at school (objective two) and have addressed the significant e-safety and child protection issues raised by Web 2.0 from a variety of informant and expert perspectives (objective five).

1.2 The questions asked

The fundamental questions for this report are:

- What are teachers doing with Web 2.0 technologies?
- How does this impact learning and teaching?
- What factors seem to assist or hinder teachers' use of Web 2.0?

In order to address these questions, the report will draw on data from multiple sources, elicited from headteachers, ICT co-ordinators, teachers and ICT personnel from a nationally stratified 'normative survey' set of 15 secondary schools, and a second set of 12 'innovating schools' in which Web 2.0 technologies were already being used in at least two curriculum areas. Survey data focused upon teachers' and parents' experiences with a variety of Web 2.0 technologies and platforms, and probed these groups' evaluation of the opportunities and risks involved in using Web 2.0 for education, as well as perceived impact upon their children or students.

As well as interviewing individual teachers, the project aimed to capture departmental, school and regional Web 2.0 activity, developing a number of school-level case studies and vignettes of innovating practice, while also looking at system-level factors such as the original stimulus to innovation, resource investment and development, technical infrastructure specification, the management of widespread adoption, barriers and facilitators to sustaining good practice, security and privacy concerns, and the integration of classroom innovation with learners' out-of-school engagement.

In investigating factors which facilitated or inhibited Web 2.0 innovation in a school, the focus was on motivations for innovation, supportive aspects of the institutional context, and perceived effects for learners. Some of the barriers and facilitators to implementation which were specifically addressed with participants included e-Safety issues, legal, content and curriculum issues, and portability and access issues. Where challenges had been faced in implementation, the team sought detailed understanding of the processes and outcomes involved.

In both interviews and surveys, two rather different approaches to Web 2.0 were encountered. Some practitioners saw Web 2.0 as essentially a set of tools – such as wikis, podcasts or blogs. For others, however, the term 'Web 2.0' was seen as indicative of certain educational practices and activities that used the internet to form and sustain networked communities, for example, through collaborative group work or peer assessment. Many people who were interviewed noted that Web 2.0 tools may be used in ways that do not resonate with such a Web 2.0 ethos – for example, a teacher may use a blog simply as a noticeboard for teachers to communicate with students, with no commentary from students allowed (or, if commentary is enabled, no engagement). For some practitioners, therefore, Web 2.0 implementation was primarily about adopting Web 2.0 tools; for others, it was about transforming education to resonate with the Web 2.0 ethos of establishing and sustaining collaborative learning communities. These differing approaches have informed the

structure of this report by encouraging exploration first of tools, followed by practices deriving from the Web 2.0 ethos.

1.3 Sketching the methodology

In order to obtain a nationally representative picture, but also to ensure that the project encountered many examples of good practice, researchers worked with two populations of schools: a normative group; and a group of Web 2.0-innovating schools. The 15 normative sample (NS) schools were a subset of the 27 schools identified by the national ImpaCT2 project in 2002; where schools declined to participate, others matching their demographic and ICT capability were approached. In the case of the 12 Web 2.0-innovating schools, inclusion necessitated evidence of active and sustained involvement with Web 2.0 approaches in at least two curriculum areas. In the event, the practice in over 70 schools was evaluated before selecting the 12 innovating schools whose practice is shown in this report. The final set of schools spanned 18 local authorities, from Devon to Teesside. Multimedia interviews with 18 teachers across the country who had made significant progress as Web 2.0 innovators within Key Stage 3 and Key Stage 4 contexts were also conducted. Most of them are currently working teachers in this sector, although three have adopted advisory or consultant roles and are significant leaders in the informal network of Web 2.0 innovators. Details of recruitment procedures for schools and individuals are recorded in Appendix 2.

The project team carried out surveys with more than 2,600 students and 206 teachers from the participating schools. In order to elicit the views of parents in the schools surveyed by the project, participating schools were asked to distribute a letter to all parents of students at Key Stages 3 and 4 inviting them to participate in an online parent survey, providing a URL and information for freepost return of a paper-based survey if they preferred. Only 76 parents from participating schools responded, six of whom used the freepost service, while 45 parents responded from the service, management and administrative listings of one of the research centres. Due to the size of this sample, which represents less than 5% of the target population, generalisations from the results are indicative of the views of only an interested sub-sample of parents. In addition, approximately 100 focus groups were held with students at 25 schools. Interviews were also conducted with approximately 150 teachers, managers and technical staff at the project's 27 schools. Unless otherwise indicated, survey data from the two populations of schools are reported together.

In addition to seeking examples of safe and effective practice within schools, the project also sought the views of national leaders of ICT in education on the relationship between their own organisation's ICT policy and that of relevant schools, local authorities and related regional broadband consortiums (RBCs). As part of this

effort, extended telephone interviews were conducted with 10 RBC and local authority ICT managers.

The triangulation of data from surveys, focus groups and interviews with multiple informants from the participating schools, and the ability to compare this data with the observations of national managers, lends authority to the evidence presented throughout this report. The interview extracts presented are representative of the views of the subject group in question, except where debates and dissenting opinions are specifically noted.

1.4 Investigating impact: Boundaries and complexities

In this project's view, there are three stages to engaging in educational research:

- First, the field must be examined for trends – these trends should be situated against existing practice and research, and tensions and opportunities should be identified and explored. A taxonomy or map of the field is produced, and this new trend is located within the landscape. For Web 2.0, this was addressed in the Becta report, *The Current Landscape – Opportunities, Challenges and Tensions*.
- Second, more detailed analysis indicating the methods and impact of particular practices should be undertaken. In this stage, the aim is to capture existing and novel practice, to investigate the facilitators and barriers to use, and explore impact upon learning and teaching activity. The perceived experiences of participants provide valuable information about impact, and bring to the fore problems for subsequent research. This stage of research is crucial for identifying the boundaries of the topic under research, and for drawing out its complexities.
- Third, researchers may conduct intervention studies or analyse results of learning outcomes, such as standardised test scores, in order to provide evidence that the practice under investigation is effective in facilitating the learning of the individual student.

This report focuses on the second stage and maps out the boundaries of Web 2.0 practice as it currently exists within UK secondary schools at Key Stages 3 and 4. It identifies and explores barriers and facilitators to implementation on system-wide and school-wide levels. It evaluates impact by examining reports of engagement and the perceived qualities of relevant processes and outputs. It examines teachers' observations and student self-reporting of impact on learners, and on the processes of innovation at individual and institutional levels. It highlights choices, opportunities and visions presented by Web 2.0 in education. The report also attempts to draw out the implications for current policy and suggests directions for future practice and research in this area.

2 Web 2.0 technologies in action

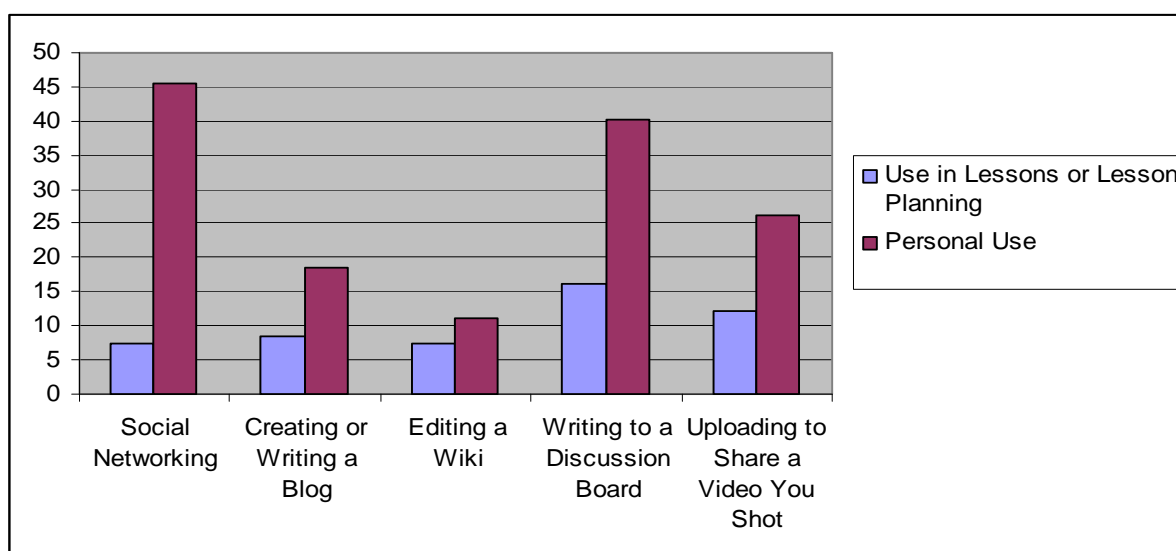
This section of the report will describe and give examples of the use of particular Web 2.0 tools as practised by the Web 2.0 schools and innovators the project encountered. The taxonomy of activities that frames this section was derived from the first project report, *The Current Landscape – Opportunities, Challenges and Tensions*, in which interested readers will find discussions and explanations of different Web 2.0 technologies.

Social networking is discussed because of its ubiquity among learners out of school and relative absence in school, while blogging, wikis, conversational arenas and media sharing (including podcasting) are included because they were the four most prevalent expressions of Web 2.0 activities in the Web 2.0 schools. Most of the exemplars are drawn from the Web 2.0 schools, but some describe the activities of individual innovators. Discussion of each family of tools is preceded by a brief description and followed by key points. More details of exemplars may be found in Appendix 2: Case studies.

Less prevalent activities are then examined: media manipulation, social bookmarking, collaborative editing, syndication and recommender systems. Exemplars are provided where available.

2.1 More prevalent activities

Figure 1: Use of more prevalent Web 2.0 tools by teachers in normative and Web 2.0 schools



Even among the more prevalent Web 2.0 activities in the sample, widespread use of these tools is fairly low – as little as 7.3% of teachers have used social networking or editing of a wiki in their lessons or their lesson preparation. By contrast, teachers' personal use of these technologies is greater, and similar to students' reported use for tools such as discussion boards.

2.1.1 Social networking

Social networking sites are websites which structure social interaction between members who form sub-groups of friends. Examples popular among the learners and teachers studied include Bebo, MySpace and Facebook. Many of the more commercially successful sites incorporate extensive functionalities such as facilities for private messaging, blogs, uploading of photo, video and audio content, commenting capabilities, multiplayer games and quizzes.

Project findings concerning student use of Web 2.0 indicate that 74% of the Key Stage 3 and 4 students surveyed have at least one social networking account. However, nearly all social networking is blocked in school, and therefore plays very little part in the ICT curriculum, although students commonly attempted to access such blocked sites through the use of proxy bypasses. Only 7.3% of teachers reported using social networking sites in lesson planning or in lessons. Likewise, teachers use these sites socially with less frequency; relative to students, only 45.6% of teachers use these sites recreationally.

A rare instance was found of a teacher sharing his Facebook and Bebo pages with students:

“Initially when I started sharing my Facebook and my Bebo pages and addresses and they find you, there's a lot of, I guess, kudos to be someone who's commented on the page of Mr [teacher's name], I went on his page and I said this and stuff. But I have been surprised that they're almost limited in the things they've got to talk about to me. They don't know a great deal about my life, or even if they do, they don't know if they should comment, so it's 'Hi sir' but the next question is 'Can you help me?' or 'What do you think of this?' or 'I found this website'. So in terms of interaction with teachers, that is the common ground we share, the common ground we share is that I teach them maths or I teach them ICT.” (Teacher, high user, W2)

Practitioners' aspirations to utilise social networking in school encountered particular obstacles which then shaped the way the tools were used. In the initial contact with school W12, researchers were told that a social networking tool had been implemented for some ICT and Classics classes, along with blogging and forums using specialist tools. Also, researchers were told students were using an open

source online photo album for A-level photography and an inexpensive online photo gallery tool as a general image library. The school was planning the introduction of a virtual learning environment (VLE) and assessing/trialling a range of options. They reported that they had been investigating hosting their own social networking. All of this development had apparently only taken place since September 2007 when they installed an open source server which would allow this.

However, during the research visit, it became clear that the actual prevalence of these activities had been very much exploratory and not widespread. This was not through lack of interest, but an overall problem with the external filter implemented by the RBC which, for example, blocked the social networking site and also certain search terms. This major barrier was at the root of the school's desire to implement a 'walled garden' VLE, as this was seen as one of the easiest ways of overcoming the filtering issues experienced to date.

One Web 2.0 school (W7) developed an alternative to the content-heavy VLE that students can already access, harnessing Web 2.0 tools to engage learners. It has been created by teachers within the school and is now available for other schools to purchase. It offers a closed environment with blogs (for teachers and students), the facility to upload files either for assessment or publication, and an e-portfolio to support specific project work. In addition, students can edit their profile, sharing personal interests and uploading photographs. Finally, it facilitates instant messaging – the only means of engaging in this activity within school. Students can create friendship groups online allowing them to control who has access to personal spaces and who can communicate with whom. Sanctions are given for inappropriate use, placing the onus of responsibility with the student. The instant messaging is currently largely used for social communication, which sometimes requires controlling through classroom management. However, instant messaging is viewed as a positive incentive to engage students with the environment (which is being populated with learning resources) rather than being perceived as a major classroom distraction. Thus, the benefits for teaching and learning are seen to outweigh the challenges. Currently, three or four departments are using it as well as some individual teachers across the school, but there will be a drive to encourage more widespread uptake in the next academic year:

“They can talk electronically now... a lot of the ways students engage now... students don't necessarily feel as comfortable engaging on a one-to-one, they're not as comfortable saying to their mate 'That piece of work wasn't really up to scratch' or 'You could've done that', but if they've got a bit of time to reflect and they haven't got a face-to-face, um, I suppose, not contact, you say things that you wouldn't normally say in a blog... it certainly frees up a lot of expressive ability, I think, in that kind of forum. Also students that wouldn't normally vocalise in

class... they have a chance to contribute and without any kind of pressure on them. So it's sort of levelled the playing field a bit with regard to feedback and peer assessment." (Deputy headteacher, W7)

Teachers perceived that it is popular with students because it is easy to use, and there is a degree of student ownership and control, although everything can be monitored by teachers.

The students who participated in focus groups had mixed views on the instant messaging facility. It was not used outside school as public messaging systems were perceived to be better (one pupil said you cannot see who is online when in school). The purpose of this communication tool was questioned by some:

"There are only a few lessons when most of our mates aren't there, so it's easier to just get up and talk to them." (Year 10, high user, W7)

Key points: Social networking

- Social networking using popular commercial applications such as Bebo or Facebook (on which 75% of students surveyed had accounts) was very rare in schools. Only 7.3% of teachers reported having used a social networking site in lessons or lesson planning.
- Practitioners' aspirations to utilise social networking in school encountered particular obstacles which then shaped the way the tools were used. These challenges included e-safety concerns, restrictive filtering implemented by the RBC, and integrating a walled garden social network within a VLE.
- Where social networking occurred in schools, teachers attributed its popularity to ease of use and a degree of student ownership and control, although everything could be monitored by teachers. At school W7, instant messaging was viewed as a positive incentive to engage students with the environment (which is being populated with learning resources) rather than being perceived as a major classroom distraction.
- Another important aspect of the potential of social networking in schools is the fact that some students are more comfortable using online communication than talking in class.

2.1.2 Blogging

Blogs are internet-based journals or diaries in which a user can post text and digital materials, and others can provide comments. Blogs may be fairly broad or can be targeted at a particular community (such as educators interested in technology). Blogs are an example of how a Web 2.0 tool may still be used in a more Web 1.0

way: for example, if a teacher assigns homework via blogs but students are not able to comment on the blog or post their own entries.

According to the teachers surveyed, 71.1% of teachers reported never having used a blog. Contributions to blogs are sporadic even among users, with 17.5% of teachers reporting having only used a blog 'at some time'. Teachers are divided over whether they think it is important for students to keep blogs in schools: 29.8% think this is important or very important, whereas 48% think this is unimportant or very unimportant. There was no significant difference in this opinion between normative and Web 2.0 schools, although Web 2.0 teachers were more likely to have created or written a blog.

Some evidence was found of teachers using blogs to record information, opinion and ideas, and one headteacher commented that he follows a number of educational leadership blogs. Blogs were also used for sharing good practice among staff, and an ICT teacher described how he keeps a blog under a screen name, partly to share teaching ideas but mainly to reflect on his practice, as he finds that writing things down forces him to think and come to decisions about them. Since it is available for all to see, he is careful about what he writes – 'two or three' students had stumbled across it and realised whose it was, but had added useful comments. Some teachers reported participation in forums directly connected with their work. One teacher commented that about half the comments on his Bebo page were work-related. Perhaps an important distinction here, therefore, is between teachers who see a blog as essentially a diary (which it is either presumptuous or an act of vanity to share), and those who see a blog as space for interaction between those with shared interests.

A geography teacher describing his use of blogs explained that he does not direct students straight to YouTube for clips he wishes them to use, and how this engages and empowers them:

"...because of the other things that could be on there which aren't necessarily deemed appropriate, but what the blog allows me to do is to embed videos, so that when they click on it, they view the video inside the blog... and what I'm liking is that Year 11s are feeling more empowered in that they're actually making comments on the things I put on there, and it's becoming a dialogue between yourself and the students and as a result of that they feel... more ownership over their own learning..." (Geography teacher, W2)

So, rather than setting traditional, textbook-based homework, this teacher now sets more open-ended tasks with structured support provided through the blog. In a few cases, teachers mentioned students taking devolved responsibility for, for example, the management of a music blog.

Blogging at school W2 was at an experimental stage. At the time of data collection, there were eight blogs and one that had been closed. There was a blog associated with a Key Stage 4 course which has a small number of posts but the only comments were from staff. There was a Year 8 blog related to citizenship where learners had posted a piece about themselves as refugees. There were numerous posts in February 2008 as this was an activity undertaken in school but as of March 2008 there were no comments. In the previous year (2006-07), a modern foreign languages (MFL) teacher had created a website with blogs and podcasts for German. The teacher had started a new post in another school in September 2007 and while the links to the site had been maintained, the resource had not yet been taken on by any other member of staff in the MFL department as staff felt 'you need a little bit of technical nous to run with this stuff'. A geography blog was relatively well populated but the interaction was limited, in that it was largely being used as a repository for multimedia resources that could help learners; evidence of two-way communication (comments and postings by learners) was extremely limited.

The project encountered some extra-curricular uses of Web 2.0 tools at school W2. One blog poses thought-provoking questions for anyone (within the school or not) to respond to. It was initiated in November 2006 with an initial vision of posting a 'thought for debate' on a weekly basis; 22 have been posted altogether, each attracting somewhere between five and 28 comments, mainly from staff and pupils. There are one or two voluntary discussion forums set up for pupils to use. One in relation to game design was described to be 'lively', run by pupils and used to share ideas about games. One teacher was running discussions on philosophy. There is evidence of regular activity, often out of school hours. The library staff have initiated a book reviews blog but this has not yet had any postings. A blog was set up initially to showcase multimedia work produced in a lunchtime club. There are only a few postings and nothing less than a year old.

The music department has had a blog since 2006 and uploads podcasts of performances, inviting comments from members of the school community. A current disadvantage is the time needed to convert sound files to MP3 format. The blog was being run by a Year 11 pupil. The English department recently started an extra-curricular blog project for book reviews. All readers are invited to submit book reviews and comment on each other's work. There were 82 posts from students during the readathon week but no evidence of commenting despite prompting from the teacher. This activity was seen as the 'starting point' for the English department. Another blog initiated by the mathematics department had a short piece about a Year 7 trip to the RAF in February 2008. It had received 51 comments (including some during a holiday period) from Year 7 pupils who were invited to comment on their personal experience. The PE department had just started to use the blogs to report again on sporting fixtures, following an initial experiment in the autumn of 2006.

Key points: Blogging

- Many teachers used personal blogs, but 48% thought it was not important for students to keep blogs in school. There was no significant difference in this opinion between teachers in normative and Web 2.0 schools, although Web 2.0 teachers were more likely to have created or written a blog.
- Some teachers used blogs to record information, opinion and ideas, and for sharing good practice among colleagues; some of these were available on the open internet.
- Some teachers used blogs with students, setting open-ended tasks with structured support provided through the blog, with the goal of encouraging enquiry and empowerment. Blogs were found to be useful both for in-class activities and for extra-curricular activities such as debate, peer assessment and commenting on shared experiences.

2.1.3 Wikis

Wikis are web-based services allowing users unrestricted access (sometimes conditional upon registration) to create, edit and link pages, providing an organised, socially constructed repository for knowledge. The public, collaborative encyclopaedia Wikipedia is perhaps the best-known example, but smaller-scale wikis used in collaborative activities for learning are possible.

In most cases, the take-up and implementation of Web 2.0 to initiate and sustain wikis is best understood at the level of the individual teacher. For instance, a languages teacher explained how she began by introducing a wiki for students to access resources, upload their own work and hold discussions. However, it quickly became clear that it was becoming 'quite clogged' with discussions, so she moved the discussions to a VLE where she opened a forum for each piece of work, making it much more manageable. Another teacher described the use of a wiki to develop a set of 'class rules' for the ICT room:

"One of the first exercises that [the class] did was to compile a wiki – I put some rules on about you *must* run around in the class and you've *got* to chew and spill drink on the keyboards and they were all aghast at this, and I said 'Well, you can change it if you like'. I showed them how to change a wiki and after 17 iterations we'd got a set of class rules that I couldn't have bettered myself. So there was that community built up around the wiki... they all felt that they had a choice in what they said and did and that they were able to affect those around them by helping make the rules." (ICT teacher, W2)

In MFL, Web 2.0 developments started in 2007 with the use of a wiki to act as a repository for resources and function as a discussion tool. As wikis are not designed

primarily for either of these purposes, it was not surprising that the teacher concerned found that the site was becoming 'quite clogged'. Learners have a discussion within the VLE in relation to each piece of work, together with peer assessment. Wikis are used for knowledge/research-sharing projects, such as one recently on national heroes.

While examples of teachers editing wikis for work purposes are comparatively few, 75.2% of teachers have read a wiki (32% have done so during lessons), and 46.4% of teachers agree that students should have the experience of contributing to a wiki.

Key points: Wikis

- Teachers were generally enthusiastic about the opportunities presented by wikis: 46% believed that students should have the experience of building their own wiki encyclopaedia.
- Although examples of teachers editing wikis for schoolwork were comparatively few, 75.2% of teachers reported using a wiki – 32% had done so during lessons.
- Wikis were used with students for peer assessment, development of behaviour guidelines, and sharing knowledge and research. However, some teachers found that wikis were unsuitable as document repositories and were unable to cope with the conversational demand generated, and moved from wikis to linked discussion forums.

2.1.4 Conversational arenas

This report uses the term 'conversational arenas' to refer to the variety of platforms through which one-to-one or one-to-many conversations between internet users can take place. Forums or discussion boards (in a forum the topics are generally fixed; a discussion board is often more open-ended in content) are online versions of bulletin boards, in which users post contributions on a topic-centred exchange and other users reply. Instant messaging and chat rooms enable real-time conversations between distinct users. Some users incorporate avatars or voice links into these arenas. It is the interaction and discussion using these media that are the focus of Web 2.0 style activity.

The use of chat rooms was perceived by a number of teachers to have potential in MFL, but such activity would have to be carefully structured and monitored to avoid inappropriate exchanges. Monitoring during the activity would be challenging. Forums are readily understood by teachers and are well established in some schools, yet are not used at all in others. Furthermore, in the schools where they are used, they are not used in all subjects. Where forums are used, they are normally 'closed' forums, hosted within the protective environment of a school's VLE. In terms of teachers' management of learners, a discussion forum provides the means for

supporting weaker students (through monitoring and additional, targeted prompts) and higher-ability students (through extension materials and activities).

Discussion boards seem to be a fairly accessible Web 2.0 tool for teachers to use: 44.9% feel competent or very competent with their use. By contrast, about 13% of teachers feel very competent with internet chat and instant messaging, and teachers are divided about the importance of these technologies for future use in the classroom. Learning platforms are also relatively usable for teachers, as 20.2% judge themselves as very competent, and a further 32.2% as competent.

The use of discussion forums in one Web 2.0 school has helped the needs of particular populations in different ways. Higher-ability learners have engaged in rich discussions and debates. Lower-ability learners have contributed but are less inclined to take account of other contributions; rather they respond directly to the initial prompt. This group of learners requires more support from the teacher, in the same way that they would in a face-to-face situation. In terms of online discussions, this means monitoring by the teacher and more prompts to stimulate thinking and further responses. With mixed-ability classes, this results in the need for careful balancing.

To some extent the use of technology such as discussion forums is seen to level the playing field for different kinds of learners. For example, a less confident student could edit their thoughts before posting whereas in the classroom you cannot edit speech and this can act as a barrier:

“I’ve a Year 10 class with four statemented students in and they would never raise their hand and say something in a classroom. I think they’ve maybe done it once each all year. But they’ve all contributed a dozen, two dozen times on a forum.” (Head of English, W6)

Within a VLE more generally, quiet learners who may not otherwise ask questions in class requested help by messaging their teacher directly, in a private communication. In relation to discussion forums in particular, such learners are able to find a voice within the confines of the virtual space. These students (often, but not always, of higher ability) who may not make many contributions in face-to-face contexts were able to articulate their ideas and share them with peers. For some learners, an online environment was the preferred medium for communication.

In some cases, particular subject departments have taken up the use of a specific technology. For instance, one mathematics department, where the head of department is developing the more general use of ICT as a priority, is particularly active in the use of forums in a learning platform to discuss mathematics questions. However, even in this school, where perhaps the greatest uptake of Web 2.0 technologies of all schools in the study is to be seen, the assistant headteacher

responsible for the co-ordination and development of ICT comments that not all staff are comfortable with the use of forums, and that it:

“...comes down to that risk factor [as seen by] the member of staff who’s leading it, because people say ‘Ooh, isn’t that risky, because they could post...’ [and] sometimes, yes, things like that will happen. But [in] the majority of cases, they won’t, and the pupils, generally speaking – certainly the pupils here, will use it responsibly and will appreciate it... But it is a big risk for some staff and some staff just absorb that and don’t worry, whereas I think others will panic all the time.” (Assistant headteacher, W2)

Some use of forums is restricted to particular purposes of extending the curriculum, for instance, participants in an MFL exchange programme and ‘outside experts’ as guests on a business studies forum. Another teacher mentioned useful Year 10 and 11 ‘help forums’ on the school’s VLE.

School W6 was identified in relation to the development of discussion forums in a particular learning platform in English and MFL (and initially in A-level law). Six out of 18 English teachers were using the facility and two out of six MFL teachers. However, frequency of use clearly varied by teacher. This particular school offers the opportunity to explore how a large institution is attempting to drive an initiative throughout the school, albeit still in the early stages. Nevertheless, it is arguably more advanced in its practices than many schools. Currently, its use is supported by a member of the teaching staff and a member of the technical support staff who have other commitments and hence little time. Teachers from other curriculum areas have expressed a strong interest in developing use of forums but have been asked to wait until a new member of the technical support staff has been appointed, dedicated to supporting the VLE and the school website.

In English and media studies, the forums were used in many ways: gathering research and sharing knowledge; discussions; reviews and polls; and to provide a bank of resources, ideas and exemplars. For example, reactions to particular scenes in key texts were shared among learners, beginning with an initial prompt from the teacher, seen to be a factor for success as no learner wishes to be first to make a contribution. In a research task, learners might be given a starting prompt relating to something contextual, such as Elizabethan theatres, and then gather research which they share with their peers. In a knowledge-sharing activity, individuals or groups share their work (in this particular VLE entire essays can be posted within a discussion) and elicit feedback from their peers. Similarly, teachers have asked learners to post their essay question responses within a discussion forum, creating a repository of examples to which the teacher can direct students to provide examples.

These repositories can be carried over from year to year so that later cohorts have access to an even more extensive range of resources.

The forums were largely used for homework tasks due to the constraints of the curriculum and because face-to-face activities were seen as more appropriate in the classroom: "It's bizarre to sit in a room altogether going [tap, tap] and typing. So if we're in a classroom and we can talk about a play, let's talk about the play." This does however introduce opportunities for deeper learning as the forums were seen to be valuable in extending these classroom discussions, while supporting autonomous, 'anytime-anywhere' learning. One teacher noted that discussions were most effective when there had been some prior classroom preparation in relation to the task. This approach emphasises the importance of the teacher. One of the impacts of this approach was that all pupils contributed – in one forum, a teacher said there were 600 postings by a class of 30 pupils:

"[What] was fascinating was that the conversations that would occur in the forum wouldn't occur in a classroom. So you had the very streetwise, in the best possible sense of the word, sassy, intelligent girls, fashion-conscious, and the more reticent, not yet into that scene, boys who would never talk to each other in a classroom because it just would not have been cool to have had a communication between these two [groups]. They were busy commenting away to each other in the forum, praising each other's contributions, posing questions to each other and getting them to answer... and I sat there looking at these thinking this is unbelievable. So [the discussion forum] produced a level playing field." (Deputy headteacher, W6)

Teachers are expected to moderate the forums themselves. The forums have been set such that new postings are displayed immediately 'because it needs to be instant in order for it to be powerful'. In practice, there have been very few issues. As a walled garden with each discussion generally closed to learners beyond the class, students are not at risk of damaging the reputation of the school or revealing personal information to a huge audience. In addition, the students are aware that misconduct will result in loss of privileges. The greatest danger is someone posting something inappropriate through another student's account (impersonating someone else). Students are charged with the responsibility for protecting their account and password and held to account if this occurs, although it had not at the time of this study. The success of this activity was attributed to a degree of trust between staff and students, and by treating each class as a separate and closed group, thus making moderation more manageable. In relation to scaling up the use of forums, the co-ordinator of this initiative perceived that there could be more instances of inappropriate postings as student numbers involved increased. For example, a discussion on reading and focusing on sharing book reviews for the whole of Year 7

(300 students) was being considered. However, as it was a voluntary, extra-curricular activity, it was felt that only a small number would participate.

The VLE itself was also used for resources and communication. This was seen as particularly valuable – by staff, students and parents – for students who were on study leave or not at school for other reasons (sickness, phobia, etc). In these cases, students could continue to seek advice on model answers to exam questions. For example:

“Some teachers are scared of that... that if you have a function that says that [pupils] can message you, that you're going to be inundated with hideous amounts of messages. It just doesn't happen like that, it's just natural – every student won't be messaging you. So it's helpful for you as a teacher rather than a chore. Because for example if a student's off sick, you can message them and quite often they'll message you first and say 'I'm not in school this week, I'm very poorly. What work do I need to catch up on?' And you can tell them. So for things like that, again, that is labour saving.” (Head of English, W6)

In the art department, works of art, which are currently being discussed in the classroom, are posted on a forum. Pupils are invited to discuss the pieces, responding to teacher-set, open-ended questions, for example, whether or not they would purchase it for the school grounds and who would pay for it. This was perceived to link to other curricular areas such as citizenship.

Key points: Conversational arenas

- Nearly half of teachers felt competent or very competent using discussion boards. Only about 13% of teachers felt very competent with internet chat and instant messaging and teachers were divided about their potential for future use in the classroom.
- Discussion boards were perceived by a number of teachers to have significant potential for learning – provided activities were carefully structured and monitored. They can also play an important role in personalised learning. Use was most effective when there had been some prior classroom preparation for a task.
- Discussion boards provide a means for supporting weaker students (through monitoring and additional, targeted prompts) and higher-ability students (through extension materials and activities, or through bringing in outside experts).
- Discussion boards can be particularly valuable for students who choose not to participate in class.

- Discussion boards can be a valuable locus for peer comment or peer assessment.
- Where forums were used, they were normally hosted within the protective environment of a school's VLE. Teachers were generally expected to moderate postings themselves.
- At some schools, forums were largely used for homework tasks due to the constraints of the curriculum and because face-to-face activities were seen as more appropriate in the classroom. The forums were seen as a means of extending and deepening learning from classroom discussions, and supporting autonomous, anytime-anywhere learning.

2.1.5 Media sharing

This report uses media sharing to mean the uploading and downloading of media files for the purposes of audience and exchange. Music-sharing websites and photo-sharing websites (for example, Flickr) are searchable repositories for user-donated content. Video-sharing websites (for example, YouTube) share captured film/TV clips or user-generated content, often with comment capabilities. Media sharing here includes podcasting, or broadcasting an audio or visual broadcast over the internet. Podcasts may be user-generated – for example, learners broadcasting a self-produced film on a social networking site – or involve professionals (for example, accessing podcasts made by National Geographic).

Three-quarters (74.5%) of teachers believe that students need more experience of uploading and downloading materials. These materials may be traditional, text-based documents, or take different formats such as multimedia presentations. Proficiency in communicating using visual and audio media is of importance to 54.1% of teachers.

Some languages teachers were making extensive use of 'vokis' – where an avatar on a website is used to replay a sound recording of a student (or a teacher modelling pronunciation). Students record themselves using digital recorders, and upload their sound files onto the voki site or an environment where the voki is embedded (such as a wiki). Others comment (using text which is turned into speech or direct voice recording) to support evaluation and improvement.

In one school which has begun to explore the use of podcasting, this had been mainly an end-of-term additional activity for a group of gifted and talented students, and was very much under the guidance of the teacher involved. This teacher likes the fact that the site is a safe outlet, in that podcasts cannot be uploaded until they have been vetted by the school's 'lead person' (herself). She thinks it is important to let ideas such as the use of podcasting spread 'naturally' into other parts of the curriculum, and feels that a requirement that all subjects should do it would not work.

At another school, the school council does a monthly podcast as described by the headteacher:

“They do the news – what the school council’s doing at that time – and also a couple of songs... It’s run a little bit like a company, so we have a managing director who happens to be the head boy at this moment in time, then we have an audio editor and I have ultimate editorial control, so I have to check that it’s all right. But it’s done by the students – guided, I would say that, in terms of what we’re going to look at... but in fact now it’s getting less guided as they get more proficient at it...”
(Headteacher, W2)

One individual innovator is involved with a media-sharing, internet-based network for videos made in the school. The site is organised by subject area, with varying take-up across departments. For instance, there are a variety of resources on the geography site. And these tend to be films that students have made. Now they make the films through Flash animation, through filming bits themselves...

Resources include clips of student-produced music and dance, teacher-produced revision sequences, and animated presentations created by the learners.

A number of teachers mention the use of video clips from YouTube, but whilst this clearly provides useful resources for teaching and learning, most of the use reported is not Web 2.0 *per se*. A teacher reports embedding YouTube videos in his blog, since he feels it would be inappropriate to direct students to YouTube itself owing to some of the other material on the site. Some other teachers report that they ask students to use YouTube directly, and in two cases the YouTube site is not blocked, and is hence available in school. One teacher mentions the use of free-to-use photographs from Flickr in students’ work.

Key points: Media sharing

- Three-quarters (74.5%) of teachers surveyed believed that students needed more experience of uploading and downloading materials, and 54.1% believed proficiency in communicating using visual and audio media to be important.
- General access to YouTube was blocked in all but two of participating schools. A small number of teachers mention the use of video clips from YouTube but usually direct learners to particular videos owing to concerns about access to inappropriate material.
- Podcasting was only used experimentally or sporadically in the schools studied. However, some languages teachers made extensive use of vokis where an avatar on a website is used to replay a sound recording of a student.

2.2 Less prevalent activities

Certain Web 2.0 tools were conspicuously absent or underused in the Web 2.0-innovating schools studied, despite regularly appearing in conversations with innovators and Web 2.0-savvy teachers as valuable tools in their personal lives and 'behind the scenes' of their professional lives. The families of tools which research found to be less prevalent in participating schools, or absent entirely, were:

- collaborative editing/composition (for example, of novels or mixed media resources)
- recommender systems (that make use of intelligent browsing tools)
- syndication (inviting/allowing others to subscribe to your web content)
- media manipulation (for example, using picture and sound mashing tools).

Examples of the first two families will initially be explored, followed by a brief discussion about why these tools may have been found to be rarely used in participating schools.

2.2.1 Collaborative editing/composition

Despite the growing popularity in workplaces of collaborative editing tools allowing asynchronous editing of documents by multiple authors, few schools engage in collaborative editing. Where they do, it is largely between teachers and students, rather than between students themselves.

As an example of one-to-one collaboration (though this is not strictly Web 2.0), the geography department in one school uses the VLE for students to work on drafts of coursework. Alterations are made visible using the word processor's 'track changes' tool, making it much easier for teachers to see where amendments have been made. Logs can also be consulted to see how often students have accessed the VLE.

In addition, at school W2, pupils submit their work when it is ready. It is marked using 'track changes' and returned. When the work is resubmitted, the teacher only needs to check the text that has changed. This was perceived to have cut teacher workload substantially and improved the quality of coursework. There is no need for the teacher to carry workbooks home and marking can be staggered, which suits some teachers but may not suit all. However, teachers set a limit on the number of times that pupils can resubmit their work and establish clear procedures: some pupils, for example, may expect instant feedback. Peer assessment could be introduced as part of the activity but the staff in this department are severely constrained by lack of access to computer rooms which offer whole-class individual access. The GCSE coursework is undertaken at the end of the summer term when access to computer suites is easier.

2.2.2 Recommender systems

Recommender systems include social bookmarking tools (such as del.icio.us) which enable easy sharing of online resources. A specific instance of planned collaboration is where a Year 8 class did a collaborative project on the history of the village where the school is located using a social bookmarking site. They evaluated each other's sites after compiling lists of links to useful web pages. They used a pseudo-email to register, as the school has concerns about using personal email in such circumstances. The social bookmarking site allows users to start building their page before registration is complete, which minimised the delays. One innovator describes using del.icio.us with colleagues to share useful language resources with students. Another innovator has introduced his students to del.icio.us, among other Web 2.0 tools, but finds that other staff do not think he is teaching the students what they need to know.

2.2.3 Less prevalent activities

There is little direct evidence from the research as to why some activities are less prevalent than others. However, it could be suggested that at least some of the activities which seem to be more readily taken up have direct analogies in non-digital contexts. Blogs, wikis, and conversational arenas, for instance, support the already familiar activities of writing and exchanging views. Syndication and recommender systems, by contrast, have little by way of direct analogy in non-digital contexts – they represent activities which did not exist previously, and hence may be more conceptually difficult to appropriate as they require genuinely new ways of thinking about the possibilities. To some extent, moreover, some of these activities depend on the extent of the user's fluency in the ideas and skills of the more prevalent activities (for example, accepting the conventions of collaboratively constructing knowledge), and indeed being familiar with the tools themselves (for example, being aware of the tools and publication opportunities available for mash-ups). Clearly, however, even if true, this would not account for all variations in prevalence.

Key points: Less prevalent activities

- Collaborative editing/composition, recommender systems, syndication and media manipulation were absent or rare in participating schools.
- Where collaborative editing occurred, it was largely between teachers and students rather than between students. Access to computer suites was a constraint to this activity.
- Social bookmarking tools, a type of recommender system, were only used by one innovator and one Web 2.0-innovating school (though the use did appear to be creative and valuable).

3 Impact of Web 2.0 on learning and teaching

This section discusses the educational practices surrounding the use of Web 2.0 tools, as these tools open up possibilities for learning that is autonomous and exploits the social internet, and encourages communication beyond text-based media with easy publication of user-generated artefacts. Stimulating enquiry, supporting collaboration, engaging with new literacies and generating publication will therefore be discussed, with a summary of key points following each topic. (The relation of these themes to the Web 2.0 ethos is discussed in the project's first report, *The Current Landscape – Opportunities, Challenges, Tensions*.) By providing examples of how Web 2.0 can be used to achieve the aims addressed, this section will examine how Web 2.0 tools may meaningfully motivate and engage learners, and evaluate observable outputs to assess the value of the Web 2.0 tools used in learning and teaching. Both Web 2.0-innovating schools and individual innovators will be referenced in this discussion.

Interestingly, innovators did not generally elaborate their success strongly in terms of learning, or in terms of whether such new cognitive demands enhanced collaboration, media literacy or generated new forms of research inquiry. Instead, there was a sense of continuity with existing practices rather than a radical departure from them.

Student motivation and engagement were, for both teachers and innovators, the most powerful drivers behind using Web 2.0 tools for learning.

3.1 Stimulating new modes of enquiry

Data gathered across the scope of the project suggests that, for learners, there are at least four possible rewards available from engaging with Web 2.0. Of these, 'stimulating new modes of enquiry' seems – at first sight – to be the clearest to recognise and, perhaps, the most potentially powerful. This challenge for learners to approach research and enquiry in a novel manner has several sources. It arises not just from the *scale* of the internet but also from the distinctive character of the internet's evolving contents (its 'participatory' character). This epic scale and idiosyncratic quality has, in turn, created the need for users to command a new toolset of skills: one that has emerged to help navigate, assemble and integrate the things that the enquiring Web 2.0 learner may now find.

From the teacher's perspective, there appear to be three issues to confront when conducting Web 2.0 enquiry. First, given the scale and variety of internet data, how does the learner *navigate* this vast and eccentric information space? Second, how does the learner *judge* the legitimacy and accuracy of disparate and unauthorised resources? Third, is a coherent path of enquiry easily sustained in a working

environment (the personal computer on a participatory network) when desktop distractions from research are so plentiful?

This project's conversations with learners indicated that there is a clear awareness among them of the richness of internet resources. Yet it would be premature to assume that young people's recreational internet use involved significant school-type research. Nominated favourite sites were dominated by games, social networking and media download services. Wikipedia was nominated by less than 5% of these young people as a favourite recreational site, even though it dominated their preferences for sites supporting schoolwork – where there remained only a small number and narrow range of sites declared. Teachers should not assume intensive internet use by learners implies easy familiarity with good sites for researching school subjects. Some – but not all – teachers themselves, when surveyed, indicated that they did use a wide range of sites in their own lesson planning and thus were broadly aware of key disciplinary resources, such as useful video clips on YouTube.

Teachers can therefore usefully guide learners into an awareness of useful enquiry resources. However, cultivating the learner's skill at navigating internet material and then appraising its authority represents still more challenging responsibilities for teachers. In conversation, learners often reported frustration with their efforts at independent internet research and its outcomes:

“Half of it's just grown-up words and the other half of it's things that you don't understand. Like you copy and paste your homework and the teacher says ‘How did you know all that?’”

As a result of which there can be an appetite for more explicit guidance:

“I think they spend a lot of time teaching you how to use Microsoft programs, which have a help button, but when you get into situations on the internet, there isn't a help button.... You just have to like get your way round it with using your friends and stuff like that, but it would be much better if the school like helped you.”

This is not simply a matter of navigation and judgement but of cultivating skills of synthesis and critical literacy. The form in which information on the internet may be found as a result of search operations may not be consistent with what learners expect from more familiar resources. Their traditional school books and teacher materials are designed to *instruct*. They scaffold the learner's enquiry in a sympathetic way. Material stumbled across via search engines can be more intimidating:

“If it was like a science test, I'd probably go on like and I'd probably look through my books instead of like going on to a science thing,

because you know where everything is on the science books and I don't really know many web, I know a few, but they're just, they come up with maths things that don't really actually tell you much about what you want to know."

It was also noticed that more traditional texts not only instruct you, they are also likely to be well matched to the various tests and examinations that learners and their teachers are anticipating:

"It's this thing that I've got a syllabus and I've got to get through it and the kids have got to know everything. So therefore you go into delivery mode and the kids go into receive mode and they go into regurgitate mode, and as long as they can spew back the answer during the examination, they're fine. Nowhere in this is any learning. If any learning is taking place, it's accidental." (Headteacher, N10)

There was an awareness of such challenges among the teachers interviewed. But it revealed a tension. On the one hand, enthusiasts often expressed their enthusiasm in terms of the 'independence' of enquiry that Web 2.0 access offered:

"It's then allowing them to do more in their own time, you know, sort of voluntary, without me saying... It's motivation. It's independent learning. There are various school issues that this addresses, like independent learning... they're sort of doing this off their own bat." (Innovator 13)

Yet, on the other hand, this was tempered with an awareness that independence was something that learners needed to be guided into acquiring. Of course, some teachers expressed suspicion that Web 2.0 supports novel enquiry approaches – or did not believe that Web 2.0 tools added value beyond their discipline's current practices:

"I know sometimes I've felt a bit of reaction against when you see in the media or you hear from government figures this idea that basically you can revolutionise education just by sitting all the children down in front of a computer and suddenly they're learning loads, and actually it doesn't work like that. So, in a subject like history, we think we can teach this subject very well without them having to fiddle with computers all the time." (History/Classics teacher, W3)

Consequently, there seemed to be a tension between the idealised hope that learners may gain new autonomy and a realisation that private enquiry is actually difficult, or a belief that Web 2.0 may not be the way to accomplish this. For some

teachers, this may evolve into a belief that if help is not forthcoming, then an opportunity for moulding a direction of interest and intellect may be lost:

“...that’s something we need to be teaching our kids. How do you cope in a world where information overload happens every day? How do you pick the important bits? How do you decide whose blogs you’re going to read or which news you’re going to follow? The danger is the fact that if we don’t open up to that, they end up reading the online equivalent of *Heat* rather than engaging with lots of the other stuff that’s... you know... It would be terrible if in five years’ time the web had reduced itself to the level of the lowest common denominator.”
(Innovator 3)

To some extent, progress in acquiring skills of Web 2.0 investigation depends upon familiarity with the new tools that allow aficionados to navigate, share, discover and remain alert to new developments when they are using the internet. Learners’ abilities to engage in the collaborative enquiry afforded by the social internet will depend to an extent upon these skills. Social bookmarking, recommender systems, RSS feeds and other such services were eagerly discussed by the innovating teachers interviewed. Yet, although their own internet enquiries were supported by a fluency with these tools, they rarely incorporated them into their work with learners. The other teachers interviewed were less familiar with such possibilities for managing internet encounters. So, overall, these resources were simply not entering into the children’s repertoire. Unsurprisingly, they were almost never invoked in this project’s conversations with young people.

The third identified challenge of Web 2.0 enquiry concerned how it got managed in a multitasking work environment. Teachers and learners were forthcoming in acknowledging that this animated style of working was typical of how young people engaged with networked computers. Whereas it seemed a source of pleasure for the learners, it was often a matter of weary tolerance among teachers. Such desktop multitasking was something unlikely to happen so easily at school – where tasks were made more focused – but understood to be very much out of teacher influence in these learners’ homes.

In summary, the opportunities for stimulating new forms of enquiry seemed poorly developed among these young learners. While they were aware of the scope of internet resources and wordly-wise about the cut and paste opportunities, they could also be impatient with the unfriendliness of the internet as a study support. It seemed clear that there was much work that could still be done in schools to shape strategies of enquiry and to cultivate realistic and positive expectations of the internet as a research opportunity. While teachers were themselves more comfortably

discriminating in their own research (say, for lesson planning), they were not yet investing heavily in developing such enquiry confidence in learners.

Key points: Stimulating new modes of enquiry

- On the one hand, enthusiasts often expressed their enthusiasm in terms of the 'independence' of enquiry that Web 2.0 access offered; yet this was tempered with an awareness that learners needed to be guided into acquiring this independence. Consequently, there seemed to be a tension between the idealised hope that learners may gain new autonomy and a realisation that private enquiry is actually difficult.
- Opportunities for stimulating new forms of enquiry seemed poorly developed among these young learners. While they were aware of the scope of internet resources, they could also be impatient with and intimidated by the internet, and lacked critical literacy skills. While teachers were themselves more comfortably discriminating in their own research, they were not yet investing heavily in developing such enquiry confidence in learners.
- Supporting the development of critical internet literacy would appear to be an important area for the future.

3.2 Supporting collaboration

The social internet affords new opportunities for engaging in collaborative learning activities. Tools such as wikis and blogs are predicated upon social dialogues through which ideas are explored, arguments are refined and knowledge is constructed. Applications such as social bookmarking and recommender systems enable sharing of resources with greater ease and sophistication than previously possible. Of course, collaborative technologies also introduce concerns about authenticity, attribution, assessing understanding and keeping students 'on task'; these concerns apply to collaborative practices more generally, as well as Web 2.0 tools in particular.

3.2.1 Do practitioners find collaboration desirable?

Of consideration is whether or not teachers seek to foster collaboration and see it as beneficial. According to the survey, 81.9% think their students need more experience of collaborative learning, and 65.2% of teachers think Web 2.0 tools could support more effective collaboration. However, 41.2% of teachers had never used Web 2.0 to facilitate student collaboration.

Collaboration between students does not always take place in class, and nor is it guaranteed on the internet. It involves motivation, a task that is in some sense perceived as authentic, and careful structuring of activities, suggesting an important

role for teachers. An ICT co-ordinator commented that there was no question that students now had more opportunities to collaborate, both in and out of school, but another teacher's observations reflected the difficulty some practitioners may have in assessing the prevalence and unique impact of collaboration, particularly out of school:

"I really don't know, I don't know what impact it's had [on collaboration]... I'm not sure how much they see the Web 2.0 technologies they use as being applicable to the work they do in school. So I really don't know. It's a conversation I ought to have with them, probably." (Teacher, low user, W2)

However, another teacher is a lot clearer about the potential benefits of Web 2.0:

"...definitely the collaboration... you hear them talking about what they're doing and it's funny because they don't realise they're actually doing work and they're planning things... 'If you do that this weekend, I'll make sure I respond by Sunday evening...'" (Assistant headteacher, W2)

Not all teachers interviewed saw collaboration as desirable, and some mention was made of the influence of the assessment system, which emphasises individual attainment, and translates in some cases into anxieties about plagiarism and guidance to avoid collaboration. A headteacher makes this observation about the examination system:

"What examinations test is... a recall of knowledge, the ability to apply algorithms to find solutions without necessarily understanding what you're doing, and working independently... Real life tests the ability to collaborate, the ability to work with uncertainty, the ability to find out knowledge from a great sea of resources, not your own personal mind, not your memory. So exams are about as different from reality as it's possible to be, and yet we use examinations as the gateway to further education, as a gateway to employment, and as the meter by which we measure how well a school performs." (Headteacher, NS10)

Despite many students' proficiency in using collaborative spaces online, such as multi-user games, instant messaging and social networking, they do not always make the connection between these social spaces and their potential as platforms for learning. As well as acknowledging the communicative functions that make these tools so compelling to many young people, there is space for teachers in encouraging learners to use familiar tools to support learning, and to support them in developing the skills needed for this:

“The problem I think that we would probably find is that a lot of the kids here view those sort of websites [which might support collaboration] as chat spaces, rather than something that’s constructive.” (ICT co-ordinator, NS2)

3.2.2 Examples of practice of using Web 2.0 to foster collaboration

Many teachers noted that Web 2.0 tools are well suited to collaborative activities in general. Clearly, activities that are grounded in communication (discussions, speaking and listening) can easily be facilitated through technological tools.

Some ICT co-ordinators explicitly identified the way in which students multitask at home, and use social networking and chat technologies to work collaboratively on homework. One suggested that students do not see a distinction between using the computer for work and for play, and others noted that pupils are doing homework at ‘unexpected times’ (for example, in the early hours of the morning) and emailing it in, and that it was interesting to be able to get this insight into students’ work practices.

Another ICT co-ordinator was sure that students were using social networking sites to collaborate on projects and assignments, but was concerned that the teacher was ‘out of the loop’. An ICT teacher in another school commented that students were using MSN to collaborate on homework.

A teacher who experimented with wikis in his school commented that he had to close them down temporarily as the virtual server on which he was hosting them could not cope with the traffic, the students having responded so enthusiastically to the opportunity.

Online discussions, whether through forums or blogs, were perceived to be more inclusive (involving all students, and in particular those who might not contribute voluntarily in face-to-face settings). In addition, they are not necessarily constrained by timetabling.

3.2.3 Peer assessment

Opportunities for peer assessment were believed by some teachers to be greatly enhanced by Web 2.0 tools. Pupils could share their work with their peers, who in turn could easily access the work and comment on how to improve it or extend it further. Blogs, for example, can be used in this way to stimulate enquiry and foster collaborative learning:

“Generally a teacher will set a question, in their own blog, and ask students to comment on that question, then students will have to write... We’ve had a couple of teachers who’ve asked students to write stories, short stories, and they’ve just written them into their blogs. And

then some ask [if] they can get friends to read it and comment on it. And they can get feedback. So you get peer assessment going on as well which is quite nice.” (ICT teacher, W7)

As has already been noted some students are more likely to comment on each other’s work online than within the less anonymous arena of the classroom.

3.2.4 The compelling nature of collaboration

Evidence suggests that for many learners, the opportunity to engage in social, collaborative learning is intrinsically engaging. Web 2.0 practitioners regularly noted that even more reticent learners made powerful contributions to online collaborations. Forums were reported, at least in some schools, as having strong motivating effects. The following is a particularly striking example:

“I think some of the English forums are quite mind-blowing. Year 10, two years ago, were doing Hitchcock and there were almost 600 postings from a class of 30 students. Every child posted, but what was really powerful about it was, first of all, no hiding place. In class, inevitably, you don’t get everybody contributing. With this, every single student contributed. Secondly, what was fascinating was that the conversations that would occur in the forum wouldn’t occur in a classroom. Reticent, less mature boys and sassy, more mature girls would never talk to each other in a classroom – it would not be cool. They were busy commenting away to each other in the forum, praising each other’s contributions, posing questions to each other and getting them to answer and I sat there looking at these thinking this is unbelievable. So it produced a level playing field. Thirdly, it provided anytime-anywhere access – they were contributing after midnight because it suited their rhythms or they had just thought of something. Then, fourthly, the dynamic – it could go off in all directions. I made a post about the morality of directing a film. Well, there were 300 posts on that and we set that up as a separate thread...” (Deputy headteacher, W10)

The social interaction afforded by Web 2.0 can enable strong opportunities for group-based enquiry. As an example, school W2 reported wikis and forums being used in geography to ‘huge effect’ to engage students in collaborative activities. In a reported forum discussion:

“...there was a lot of real learning going on. The class was silent because they were so engaged... and there were seven conversations going on. We couldn’t have had that in a real class. It would have been one conversation guided by the teacher. We had seven conversations

and children were engaged in multiple conversations. The conversations continued when they were at home.” (ICT co-ordinator, W2)

This ICT co-ordinator noted that technology enabled simultaneous, learner-directed discussions, and that these discussions were extended beyond the lesson in question.

Key points: Supporting collaboration

- The social internet affords new opportunities for engaging in collaborative learning activities. Activities grounded in communication (such as discussions, speaking and listening) can clearly be facilitated through technology, and 82% of teachers indicated that their students needed more experience of collaborative learning.
- Two-thirds of teachers thought that Web 2.0 tools could support such collaboration, although 41% of teachers had never used Web 2.0 to facilitate it.
- Perceived challenges to using Web 2.0 to facilitate collaborative learning included barriers presented by the assessment system, and both teachers and learners viewing Web 2.0 tools primarily as ‘chat spaces’ and copying information from the internet is theft.
- Although not desired by all practitioners, collaborative learning was viewed by many teachers as intrinsically compelling to learners, with activities generating substantial communication from a wide range of learners. Some teachers had found that Web 2.0 technologies could encourage participation in simultaneous, learner-directed discussions which extended beyond the lesson.
- If collaborative learning is a key area for future development, teachers’ comments suggest that they are more likely to include it in their practice if activities such as peer assessment and group enquiry are brought into the assessment system.

3.3 Engaging with new literacies

Occasionally, a link was made to new literacies as one of the new experiences that Web 2.0 seems to shape for learners, although as noted earlier, this was not the driving force behind practitioners’ implementation of Web 2.0 tools. The issue of assessment was raised again here, as the current assessment system was perceived by some teachers as providing a disincentive to engaging with Web 2.0 tools, especially those which utilise new literacies. However, only 31.2% of teachers disagreed with the statement ‘Assessment should shift from writing towards visual media’, while 22.9% had not yet formed an opinion about this.

3.3.1 Examples of practice of engaging with new literacies

In the remarks below, there is discussion of the advantages of providing learning opportunities in media other than print or in formats other than the class presentation, including accommodating different personalities and learning styles to enable greater participation:

“...a very large proportion of homeworks I set will be forum-based. That really engages students, especially weaker students. I’ve found that students who would not sit down and put pen to paper in their exercise book will sit down after midnight and put postings on a forum. It appeals to different learners, different learning styles... My greatest user was the quietest boy in the [high-ability] class who went on and wrote the most amazing things... that benefited him, because he was articulating his ideas, and benefited the whole of the rest of the group, because they were able to ‘hear’ these ideas that ordinarily would have remained locked in his head.” (English teacher, W2)

“...so gone are the days when they whack a 10-page document with a bit of clip art from Word on there... it’s much more interesting for them to create a Flash film or a Windows Movie Maker film or whatever.” (Innovator 1)

In science, for example, a discussion was created to support a topic on death and decay, primarily to investigate micro-organisms and what they needed to grow. The focus was mummification as the teacher felt this would be more interesting for learners, which proved to be the case. Students found examples (such as pictures of shrunken heads) and posted these to the discussion, as well as animations. In addition, a teaching assistant (a physics graduate about to start teacher training) also participated in the discussions, which was perceived by the teacher to extend opportunities further. The discussions were supported by other resources such as presentations and quizzes (which could be attempted as many times as students wished). One teacher said that students were also creating quizzes themselves and uploading them. The VLE was believed to support the natural curiosity of learners – they could access all resources within the environment and often looked through and interacted with many more than those required in homework tasks.

3.3.2 Engagement through different modes of expression

Teachers reported engaging learners through the use of new literacies which had greater appeal to them, or with which they felt greater ease:

“...that’s not telling them to go home and read documents, that’s not telling them to go home and write some notes. It’s teaching them in a

different way and it's making them respond really, really well to it."
(Innovator 1)

Vokis, or avatars which learners can use to record speech, have been particularly useful in language learning for a number of individual innovators and schools. Vokis are adaptable to various activities because they can be embedded in blogs, and teachers and students can leave comments on each other's broadcasts; written text can also be converted into speech (to check spelling through mispronunciation of text). School W4 uses vokis on an open internet blog, partly in conjunction with a school in France. A teacher at that school reported great success in using vokis for strengthening speech production, pronunciation and peer assessment. She found that some students were spending time at the weekends re-recording their vokis and personalising their avatars with great detail. A small number of students went on to use instant messaging with the French students with whom they had been communicating by voki. She was impressed with the engagement and confidence they demonstrated, despite having to moderate comments because of some incidents of misbehaviour. The school is highly receptive to the activity.

An individual innovator described how using different literacies has proved engaging for the 11- to 16-year-olds with social, emotional and behavioural difficulties whom he teaches in Scotland. Through Voice of the World, an international group of more than 30 schools, pupils create cultural artefacts each month using a different Web 2.0 tool each time – examples include Google videos, animotos, vokis and voice threads. Pupils enjoy linking with each other and value the available audience.

3.3.3 Supporting learners with poor literacy skills

One teacher commented that homework had been improved because the use of Web 2.0 tools and the internet introduced greater variety and removed some laborious aspects (that is, copying an existing diagram rather than drawing it by hand). Technology in general is seen to be valuable for pupils with poor literacy skills:

"It's a different way of engaging pupils... obviously a lot of the pupils that I work with have poor literacy skills and so to have to write all the time... is difficult for them. When they produce something using Movie Maker, then they see it's actually a very good product and get a lot of satisfaction about that." (Special needs teacher, W4)

Learners with special needs are able to revisit materials and resources within a VLE, as well as take their time contributing to discussions online, and even editing contributions before posting them. A special needs co-ordinator at a normative school commented that the students with whom she works often have poor social skills, which can usefully be developed in online chat.

Key points: Engaging with new literacies

- Practitioners noted that Web 2.0 engaged learners with different learning styles or special needs and supported learners' natural curiosity by enabling expression through different media and a sense of audience, access to further resources and the ability to gain confidence and skill in speaking and presenting.
- The anytime-anywhere availability of Web 2.0 can also be highly motivating, and can enhance learner autonomy.
- Over two-thirds of teachers agreed with the statement: 'Assessment should shift from writing towards visual media.'

3.4 Generating publication

Web 2.0 offers unprecedented opportunities for students to create their own content – whether text-based or multimedia, artefact or commentary – and to publish this content to a wide audience with relative ease. For some young people, this is a compelling prospect. However, the students at participating schools engage in comparatively little publication of content created by themselves or their peers. Therefore, teachers have an important role to play in providing learners with the skills and confidence to generate and publish their own content. Teachers reported that publication was associated with feelings from learners of ownership, and engagement through a sense of audience. Such activities enabled learners to develop and demonstrate their individual talents. Publication lends compelling weight to activities of peer assessment and also to currently underdeveloped experiences of engaging in learning informally or outside the classroom. Though intrinsically appealing to many learners, teachers play an important role in initiating and supporting student-led publication activity where learners do not view this as a learning experience.

3.4.1 Examples of practices of generating publication

Publication can be practised within different contexts and to achieve differing aims. Learning platforms and e-portfolios are currently the site of much of the publication activity occurring in the Web 2.0 schools, particularly as regards text-based artefacts (as opposed to podcasts which may be shared through an external website).

In school W9, the VLE has an e-portfolio facility which has been enabled since September 2007. This has been used to offer students personal spaces on the VLE. Guidance on how to use tools to do this is provided as a 'unit of work', accessible within the VLE, and student engagement with this activity is stimulated both by the ICT curriculum requirements and a competition to find the 'coolest' space. Every student has the option to create this space and have an introductory lesson in Key

Stage 3, and later year groups (Key Stage 4) are required to create blogs and interactive surveys.

In another school, the ICT co-ordinator encouraged his students to post comments on each other's work which had been uploaded in the school's VLE. He intends these practices to spread through the school, so is leading by example and hoping to get the skills and predispositions established with the students. In ICT, commenting by students on one another's work is part of the 'testing strategy' for the evaluation of what they have produced, and has been set as homework. Though the department gets good results at present, the ICT co-ordinator wants to move towards students taking more responsibility for their learning as part of the approach to personalisation. He saw these moves as being 'the beginning of a journey'. He and a colleague have also prepared the ground for a pilot of similar approaches with 'gifted and talented' students in science.

At school W2, an ICT teacher has tried to develop aspects of the open source VLE (used mainly for supporting ICT but also geography and one or two other subjects) so that the appearance is similar to public social networking sites but with a primary aim of developing approaches for peer assessment. In ICT, for example, the pupils can upload an image or piece of writing and other pupils can view and rate it with a scale and comment but only once they have submitted something themselves (the average rating is calculated and displayed).

3.4.2 Ownership

This report has described some of the practices behind generating publication of material, and now turns to exploring the factors for success of this approach. A general principle among innovating teachers is that a discipline under study works well if students are creative around that subject, and this means that the designs emerging must be their own as far as possible:

"That's our strapline for this – 'By students, for students'." (Innovator 1)

"In terms of them publishing and researching and then showing their work and looking at it online, they're producing the content as well. So again it's all these education buzzwords, I suppose... but they're facilitators rather than the font of all knowledge at the front of the class." (Innovator 2)

3.4.3 A sense of audience

Having granted that students engaged with these Web 2.0 activities and found a sense of ownership appealing, innovators were most inclined to invoke the appeal of 'audience' to explain what was most often appealing to them. Some teachers drew attention to this form of success:

“Kids just really enjoyed seeing everybody’s work. They would spend just as much time reading what other people were doing as well as...”
(Innovator 18)

The sense of audience, or stretching the walls of the classroom, was sometimes extrapolated to wider issues of meeting the challenges of globalisation:

“...that kind of tiny community that we have in our year group, you know, it’s going to build on that sense of community, I suppose, by sharing something that we’re doing, but also all being actively involved in that sort of sharing process. I mean, you know, sharing is something that you so easily do... you give these children through these technologies a global kind of perspective...” (Innovator 18)

A perceived benefit of publication, in school W2’s experience, is that because students know that their work is public, they take more care and work a little harder. There is also a space for a ‘wall’ (or message board) within the leaning platform. Students used this to comment on aspects of the site and how to improve things. Students will shortly be able to use a ‘friends’ facility to control who has access to their personal work. There are plans for a button on the VLE which enables students to flag anything that is inappropriate (a form of peer monitoring). Another development involves the use of the platform profile feature. Rather than using this for personal information (uploading images and adding descriptions), the site will automatically create a profile of links to student assignments. This will offer a showcase of a single student’s work. Student engagement is currently being driven through an extra-curricular joke competition. This informal activity is being used to trial the approach for supporting peer assessment. There were 200 entries and students have voted on the best ones, with a ‘leaderboard’ for all those with at least four student ratings. This work has been funded through participation in a Creative Partnerships project, enabling the school to offer a teaching point for ‘lead creative teachers’. The teacher noted that the next step was to use the facilities to support learning and teaching more directly.

Apart from its motivational significance, the importance of audience for learning or cognitive development was not further articulated. One response was to see it as a concealed strategy for simply cultivating an active experience of literacy that engages through learner autonomy:

“That’s something that I try and encourage here, just for basic literacy skills really... they’re communicating with each other and, you know, who knows if they read each other’s? But just from that you get typing and writing... I like to see them getting involved and doing something.”
(Innovator 8)

“...our students are very keen to go out and do these things [make videos] at home. Very many students tend to have Windows Movie Maker as part of the, you know, the Windows package that their parents have at home, and getting a Flash animation package off the internet – it’s not particularly hard to download. And our students just get so excited... we’re looking at innovative ways in which students can hand in work... the idea of handing in a project on the Indian Ocean and the Tsunami... you could ask for a paper-based project, but we’re very much going down that line that we often give them a choice. They can, if they choose to, make a paper-based project, or if they would like to, which we are really finding they are very keen to, they want to submit film.” (Innovator 1)

3.4.4 Development and demonstration of interests

While motivation and engagement are important markers of impact of publication on learning and teaching, the quality of the output which could be produced when publication was presented to students offers still more evidence for the transformational opportunities of publishing content with Web 2.0 tools. Teachers who had engaged in publication of content with their students often reported on the high quality of work produced:

“Some of the work that they do in their books is way below their level of ability and the stuff that they put online will be like ‘Wow! Gosh! You know, that’s a really fantastic insight that you’re offering me. Why aren’t you offering me this when you put it on paper?’ And it’s just the fact that it’s a public [within the class] forum.” (English teacher, W2)

“...and these are being submitted and they’re going up onto here and then they can be used by other students as models for films... they can be used for teaching. In fact, the next level that I want to move to now is to get some experience that we can actually use in our lessons for teaching. So these films you can see in front of you, which were provided over the holiday, that film is now going to be used to introduce the tourism unit that Year 7 do.”

School W9, which provides its students with online web spaces for personal and school use, has found that take-up and engagement is unsurprisingly varied. Some students have customised their pages both in terms of format/presentation and content (for example, uploading personal photographs, links to Flash games); about 10% of students are very active. The network manager commented that initially traffic was one-way (downloading rather than uploading) but that now there was also a lot of uploading: “...ninety per cent of that will be students.” The tools to support collaboration and communication are limited – in line with school policy, instant

messaging is not enabled. However, students can comment on each other's pages and contribute to blogs. Students from Year 10 appreciated the opportunity to express their opinions and seek those of others, and share information. Students from Year 8 were less enthusiastic, did not understand the purpose of the space and noted limited time to develop it:

"It's a place where you can express your opinion and nobody can like say that it's wrong, because it's your opinion. And you're free to share whatever you like on there." (Female, Year 10, low user, W9)

"I put like all the [local] football match results... because only a few people know about them, so I thought maybe other people would like to know..." (Male, Year 10, low user, W9)

"It's kind of a good way to get to know people as well, it's kind of like a good way to make friends because you find you make friends with people you have things in common with and if they like agree with you, then you can share it with each other, talk about it and stuff." (Male Year 10, low user, W9)

"If they like made a bigger fuss about having it, more people would like look at it and update theirs and stuff. But now there's not really time in school to update it and out of school you've got other stuff that you can update..." (Female, Year 8, high user, W9)

3.4.5 Learner initiative in publication

Despite enthusiastic reports of success in publishing students' work when this is initiated by a teacher, student-instigated content creation and publication was fairly uncommon. Apart from the submission of homework tasks, and the creation of animations, podcasts and other digital content in ICT lessons as part of the ICT subject curriculum, there is little evidence from interviews at normative sample schools that students are involved in much creation of digital content. However, in one school:

"...some of the students are getting increasingly involved in producing video clips in technology and podcasting. We have a group of students who help the web manager – they come to school events, interview people and edit it." (Headteacher, NS16)

The situation is somewhat different in the W2 sample of schools, where the creation of digital content is, if not widespread, at least more widely found. Most of this is at the behest of teachers, and has been described where appropriate in previous sections. Some schools reported increased student use of their VLEs for the upload,

storage and access by teachers of digital content, with a particular emphasis on assignments undertaken by examination groups. There are, however, very few reported instances from teachers of students taking the initiative and spontaneously creating digital content in school settings.

While some teachers may have concerns that a minority of students would desire to create or publish inappropriate material, this was not reported as a problem:

“We worked with them and, but they were sensible students we’re talking about here, as I said. Gifted and talented, sensible students, who were very aware that, yes, we want to give students the freedom to upload as much as possible, but there has to be a line because this is a school site, this is a site that parents could expect a certain type of resource on, perhaps...” (Innovator 1)

Teachers are generally interested in publishing more of their students’ work online, but feel slightly more comfortable doing this within a VLE: 67.4% would like to do this within the VLE, versus 44.1% on the public internet. It should be noted, however, that not all students find the idea of publishing their creations to be appealing: fears of criticism from peers (whether driven by poor or high-quality work), and concerns about plagiarism featured in learners’ discourse about publication, as explored in the project’s second report, *KS3 and KS4 Learners’ Use of Web 2.0 Technologies In and Out of School*.

Key points: Generating publication

- A small but significant group of innovating teachers saw publication of content as an important Web 2.0 area, and felt they had an important role in providing learners with the skills and confidence to do this.
- Despite enthusiastic reports of success in publishing student work when this is initiated by a teacher, student-instigated content creation and publication was fairly uncommon, albeit more frequent at Web 2.0-innovating schools.
- Publication was felt to enhance a learner’s sense of ownership, engagement and awareness of audience.
- Publication online was used by some teachers as a key element in peer assessment and was found to encourage attention to detail and quality work.
- Internet publication was felt by innovating teachers to encourage research, and learning informally using sources from outside the classroom.
- Learning platforms were the most common outlet for publication, through publishing presentations for use in lessons, engaging in writing

competitions, building personal web spaces, and uploading images and text for peer assessment.

- Teachers were generally interested in publishing more of their students' work online, but felt more comfortable doing this within a VLE.

4 Implementation: Barriers, tensions and facilitators

4.1 Teachers' Web 2.0 orientation: Use and attitudes

4.1.1 Teachers' views on learners' Web 2.0 use

The teachers interviewed indicated a generally high level of awareness and understanding of Web 2.0 technologies and their use by young people:

“My impression is that maybe they're taking the opportunity to experiment with their social and personal image... they sort of create a persona... there's got to be a motivation for that [channelling enthusiasm for Web 2.0 in school]... As teenagers they are spending a huge amount of time developing their social lives and developing their niche within their peer group... but can we replace that motive within school for school activities with something as energetic as their own social lives? I just don't know how they're going to balance home and school really...” (ICT/art teacher, high user, NS18)

Teachers also recognise that young people are moving fast in terms of their use of technology. To some extent, there is a 'flavour of the month' factor, but it is also the case that:

“...the kids are moving... quicker than the education structure... that's more to do with time... the kids can adapt and move a lot quicker than schools... we'll be getting there eventually... I'm worried that in five years' time we launch a VLEs with social networking and... the kids have all moved on to something else...” (ICT teacher, high user, NS14)

“...they're so used to using new systems and picking up new technologies... It's part of a new lifestyle that they've developed and... a new community that they've belonged to...” (Science teacher, high user, NS16)

Some co-ordinators mentioned gender differences in student use of Web 2.0, with boys being more attracted to games, and girls to social networking to meet up online with friends and shopping.

4.1.2 Teachers' views on the use of Web 2.0 for learning

While most teachers in this study are aware of their students' use of Web 2.0 technologies, teachers vary much more in their perceptions of the potential of Web 2.0 technologies to support learning. Survey data indicates that 53.9% of teachers agree or strongly agree that 'Web 2.0 resources could support more effective collaborative learning', but 24.3% have no strong opinion – suggesting that a

significant proportion of teachers are unsure about the opportunities presented by Web 2.0 or do not have enough information to decide either way.

One ICT co-ordinator described his experience of individual receptiveness to innovation, invoking notions of 'early adopters', and 'early and late majority' in recognition of differential awareness and uptake; others described comparable situations. Some teachers see great potential, and are enthusiastic proponents – 58.5% believe that popular Web 2.0 resources should get more use in the classroom. Others see less by way of opportunities for learning, and may be more concerned about issues such as time for familiarisation and planning, or problems of control and trust. More than a third (37.4%) of teachers believe that adopting Web 2.0 resources would be time-consuming for them, and teachers frequently (18.7%) and occasionally (47.0%) find that student use of the internet in class can be hard for them to manage.

There is little clear evidence to say that some Web 2.0 technologies are taken up more readily than others. Hence, what happens in any given school is likely to be more a reflection of local factors and circumstances, rather than something inherently 'easy' or attractive about the adoption of a particular technology. Moreover, it seems likely that one or more teachers will see an opportunity to extend students' learning opportunities in some way by means of a particular Web 2.0 technology, and will explore it on the basis of its perceived fitness for purpose. There are indications from teachers that an important factor is their beliefs about how students learn, together with their awareness of the possibilities of different technologies, and hence their perceptions of how certain technologies might be beneficially adopted to support students' learning. Experience of use influences teachers' evaluations of the efficacy of Web 2.0 tools to support learning and the context in which they are used. In some schools, social networking sites are available, but an ICT teacher mentions that if students are using Facebook during an ICT lesson, then: "They're not working... if you've given them a task... they're off-task, so it's totally inappropriate in terms of the outcome of the lesson." So it is necessary to help students identify when use is and is not appropriate.

Staff perceptions or attitudes can be a barrier to implementation in some cases. Some teachers feel that Web 2.0 and other technologies will be an additional burden and take time out of an already busy schedule. Many have concerns about becoming over-reliant on technology and then being let down by technical failure, or even worse removal of the facility due to rising costs/insufficient budgets. Some staff are concerned that it will be difficult to keep pupils on task (or on the right website) – an issue that is not particular to Web 2.0 tools but of course needs to be managed in a classroom setting whatever technology resource or tool is being used. Monitoring software is used in some schools to address this problem and educating learners is also believed to be an effective solution. Other staff are fearful of the negative

impacts of using technology (sometimes fuelled by media coverage) and this clearly acts as a deterrent for some at all levels.

Many teachers do not see Web 2.0 technologies as a separate concept or 'family' of possibilities. Rather, they are seen as part of the wider range of possibilities for using ICT to support learning. As an example of this viewpoint, the use of email was often brought up by teachers. While not in itself a Web 2.0 application, email is the computer-based communication technology which is most often mentioned by teachers, and is the best established by a long way. In terms of the process of diffusion and take-up, email indicates something of the timescale for a new technology to become appropriated by teachers, and of the interplay between personal and organisational factors involved. In general, views on email are either positive or at least accepting across all teachers in the study, though occasional mention is made of the time needed to keep up with it, and to a few teachers it is seen as something extra, rather than as an integral part of their work.

Email use can be subdivided into several categories, which provides indications into the functionalities that teachers may seek from Web 2.0 tools:

- Daily school communications to supplement staff briefings and replace paper memoranda
- Students emailing work to themselves to continue at home and/or in school
- Students emailing completed homework/coursework to teachers – tends to be older students; electronic copies are seen as less prone to loss
- Some teachers give their email address to students seeking advice and guidance by email
- One mention of pedagogic use in subject teaching, 'Compose an appropriate email to send to characters of the Bible', which encouraged further discussion about the use of language
- Some teachers give their email address to parents and invite contact and also use email to contact parents regarding any concerns. A head of key stage is in 'daily contact' with the parents of certain pupils; an MFL teacher sends regular assessments to parents and gets responses.
- Use of email at home for social contacts, etc.

No Web 2.0 technologies have penetrated teachers' awareness and practices to the extent that email, as an older internet technology, has done. This is borne out by survey data indicating that only 1% of teachers have never sent an email – nearly 70% have done so as part of their work.

4.1.3 Teachers' personal Web 2.0 use

Practically all teachers in this study are active Web 1.0 users – 93% reported having used a search engine within the last 24 hours. However, active Web 2.0 users represent a minority of the teachers consulted. Only 26% of teachers had used a social networking site in the last 24 hours (14.3% in the last week), 71.1% had never written or edited a blog, and 43.4% had never used instant messaging. Tools such as discussion boards and virtual earth tools were more popular.

A number of ICT co-ordinators and some teachers are active Web 2.0 users out of school and for personal/social purposes, for instance, by maintaining personal Facebook pages, blogging, or contributing to Wikipedia or online forums. One assistant headteacher mentioned using a Facebook page to stay in touch with friends abroad, but is 'always a bit wary' that students will find her. Others comment that they used to have a Facebook page but have discontinued it, or rarely use it:

"I set up a Facebook and I was interested in it for about three weeks. It's too high maintenance... I haven't got the time. I really only want to use it to share photos with friends and family for events. What I used to do was just email them. Then it was like, 'I'll put the photos onto Facebook...' But now I think it was a gimmick... at first, nice and new and shiny, but for me too high maintenance. If you log on once a week, you'd have 200 requests and sit there for an hour and a half trawling through this and at that point I just went 'No!' I read a really interesting article about somebody who felt the same and committed what they called 'Facebook suicide' which is deleting their account and I thought 'Yeah, that's exactly what I want to do!'" (Teacher, W10)

As might be expected, interviews suggest that use of social networking technologies is more prevalent among younger teachers, though by no means all use them. There is no reference to teachers using social networking to enlarge their circle of friends, even when this is something which they report other family members as doing. Some refer to a lack of time to engage in online social practices. There are perceptions of a generational aspect. A teacher (quoted above) who found that she did not have time to maintain a Facebook page said:

"I think if you are at university or in the sixth form, it's like an advertisement for yourself and it shows how popular you are, the type of music you are into... It can define everything about your personality without you actually having to have conversations about it, so I suppose if I were younger, it would be an essential tool for myself. But as I'm older and I don't have time to see the friends that I've got, I'm not that interested." (Teacher, W10)

Key points: Potential of using Web 2.0 for learning and teaching

- In terms of potential for learning, 54% of teachers believed that ‘Web 2.0 resources could support more effective collaborative learning’, but many were unsure about the opportunities presented by Web 2.0 or felt they did not have enough information to decide.
- Some teachers are enthusiastic proponents of Web 2.0: 59% believed that popular Web 2.0 resources should get more use in the classroom.
- Others were more concerned about issues such as time for familiarisation and planning, or problems of control and trust. More than a third (37.4%) of teachers believed adopting Web 2.0 resources would be very time-consuming, and teachers frequently (18.7%) or occasionally (47.0%) found that student use of the internet in class was hard for them to manage. Many teachers had concerns about being let down by technical failure, or even worse removal of the facility due to rising costs/insufficient budgets.

4.2 E-safety and security

This section helps to contextualise the learning and teaching practices discussed in this report by exploring the e-safety and security aspects of Web 2.0 most relevant to the debates over implementation and perceived by practitioners to be important considerations. Further discussion of e-safety and security issues can be found in the project’s fourth report, *E-safety and Web 2.0*.

4.2.1 Negotiating the boundary between home and school

Practitioners expressed concerns about the use of children’s use of the internet at home, often seeing parents as lacking the knowledge needed to guide and advise children. As with headteachers, some ICT co-ordinators in particular expressed concerns about parents’ knowledge:

“I think there are a number of parents who are very conscious and aware of security and settings that they can put on. There are [also] lots of parents out there who don’t know what to do. They are either supervising their student or the child is in the bedroom and the parents have not got a clue what is happening.” (ICT co-ordinator, NS6)

Student use of Web 2.0 technologies out of school may have an impact ‘face to face’ back in school, with parents turning to the headteacher to resolve these issues. In some instances, arguments in chat rooms – and ‘there is often fallout’ – are brought back into school by students. In general, headteachers recognise that a line must be drawn and when appropriate say to parents that they will not become involved. However, other headteachers, such as that of school W2, find the line less clear:

“...if I was a parent, and someone spotted my kid doing that, I’d like them to give me a ring... So I did ring about 14 parents and say, ‘It’s nothing really to do with me because it’s not content that’s been put on at school, but I am aware...’”

The sense of a growing divide between the ubiquity of technology in students’ lives outside the classroom, but not inside the school, extends to mobile phones:

“We’re scared of students. It’s almost going back to the chewing gum... You can’t chew in class – why not? Because... we haven’t really got a valid reason... If you’re allowed to chew it, you’d put it in the bin. If you’re allowed to use the mobile phone for what it’s there for, instead of students sneakily trying to send a text underneath the desk, the mobile phone would be on the desk and would be used properly.” (Science teacher, high user, N10)

Some schools attempt to engage parents with e-safety issues. One ICT co-ordinator referred to a forthcoming e-safety evening he will be running for parents:

“...so they can understand their obligations and ours. People have this blind faith in schools, that the school will always do the right thing. They need to know that we *are* doing the right thing, and *they* need to know what the right thing is.” (ICT co-ordinator, W8)

RBC managers echo the belief that parents must be engaged with e-safety in order for responsible behaviours to develop:

“On the team I’ve got myself and others who are able to train trainers to raise awareness and one of those key groups, of course, is parents. Many parents feel ‘Well, no, there’s no problem’ when they probably don’t know who’s been virtually invited into the household or the bedroom as it were. And I think that’s an issue.” (Local authority e-learning adviser, Midlands)

4.2.2 Regulating access to sites: Filtering and blocking

ICT co-ordinators generally have an informed view of Web 2.0 technologies, and some – particularly in W2 schools – have a brief for the development of Web 2.0 approaches in their school. They are broadly, but not uniformly, positive about the potential of Web 2.0 and are very aware of the importance of Web 2.0 to young people.

Teachers at times voiced frustration at the level of blocking and filtering of websites encountered in schools: “...we’ve banned it because we don’t class it as work...” This frustration was tempered by an awareness that students might come across

undesirable or inappropriate material. There was sometimes evidence of a tension between teachers' wish for more open access to internet resources, and a desire to restrict access in order to prevent 'play' or to ensure the duty of care.

Currently, schools have generally not enabled instant messaging between pupils onsite, though the functionality is supported. "If I let them instant message each other, there's the IT lesson gone," said one teacher. The main barrier to implementing this currently is that access is not yet monitored. Once individual monitoring is supported, the use of instant messaging as a learning and teaching tool was perceived to be more feasible.

Filtering for teacher use is often different from that for pupil use, offering greater access to sites that potentially include inappropriate material. The project found only two schools which allowed pupil access to YouTube resources. However, it was acknowledged by many that such resources were potentially useful. In one Web 2.0 school, pupils who wished to access YouTube clips requested access from the technical staff, who checked that the clip was appropriate and if so downloaded it onto a DVD or put a link to it on the VLE. In other schools, teachers, who in many cases did have access to YouTube, themselves offered similar facilities on an ad hoc and informal basis.

In many schools, staff described being unable to access websites due to RBC/local authority and/or school filtering systems (for example, political cartoons, information on the Holocaust, artwork blocked because of words in the title of the work). This was perceived to be a major barrier to using the internet generally, as well as for Web 2.0 tools. Some staff reported that they were unable to gain access to any social networking sites, blogs or wikis, despite these being perceived to be essential curriculum tools for media-related courses. In contrast, some staff in the same schools described the filtering policy as flexible, saying sites could easily be unblocked on request, indicating that not all staff are clear about how to unblock sites or whether they may do so.

School W8's e-learning manager perceived that they would not have been able to use an open source VLE if they had relied on an external filtering company, which would have been seen as too restrictive. Instead, they use their own in-house filtering (and monitoring) software.

Several schools have installed open source solutions for filtering and monitoring which are perceived in some cases to offer greater flexibility and control, and in all cases to be cost-effective. However, this requires sufficient technical expertise in-house.

Granular control of internet filtering (with different levels of access for different groups) is used effectively in two Web 2.0 schools (W2, W11) to ensure that learners

have a sense of autonomy while being afforded an appropriate level of protection. Education, particularly in relation to appropriate uses and e-safety, is seen to be key. Pupils are encouraged to become responsible for their actions. Inappropriate uses of the internet are detected swiftly through monitoring access logs, staff observations and pupils informing staff. Known 'persistent offenders' are often monitored more closely. In school W6, the persistent offenders are recognised as being the 'true techies' and their enthusiasm is harnessed to identify new loopholes and potential security breaches. This is not a unique experience; staff at several Web 2.0 schools described similar practices more generally:

"Students here are quite good... they'll come and say [to the technicians] they can do this [to access blocked sites]', so you know [when new loopholes have been identified]." (Network manager, W7)

Inappropriate uses will occur, particularly in schools which have opted for less control, so the key is to ensure that staff have an informed view of the risks and have appropriate strategies to deal with them:

"It is a big risk for some staff and some staff just absorb that and don't worry, whereas I think others will panic all the time..." (Senior manager, W4)

A major barrier to the integration of Web 2.0 technologies, as perceived by some schools, is local authorities 'over-interpreting' the law, resulting in tight restrictions and lengthy procedures/protocols. This is attributed to a desire to control and lack of trust. In one particular school, it was noted in relation to accessing a lesser-known social networking site that had not been filtered:

"As soon as lots of pupils log onto the same site, it'll go through county. They'll look at it and then they'll stop it. So I don't think there's much point in me starting... When we started the wiki, because a lot of pupils were logging onto it from school, it was blocked for a while, so that county could look into it and see what we were doing so we were allowed to use it. It's almost as if they don't trust us – they don't trust our judgment in what the pupils can access." (MFL teacher, W4)

In another Web 2.0 school (W12), the filtering system imposed by the RBC was so restrictive that even some teachers told students how to get around the filters (for example, using IP addresses in the URL instead of the normal address). This school's response to this major barrier was to investigate implementing a walled garden, where students would have access to all the resources they needed without accessing the internet. Management had to some extent self-imposed this barrier:

“It’s a huge safety blanket for us and I wouldn’t want to be outside that.”
(Deputy headteacher, W12)

In contrast two Web 2.0 schools installed their own filtering systems having discovered that the local authority filtering was not always effective, being concerned that pupils could easily access inappropriate material.

The RBC perspective on filtering begins with its duty of care to students. While schools regularly declare local authority and RBC filtering procedures to be constraining and irksome, RBC leaders point to schools as the chief determinants of heavy-duty filtering policies:

“When you’re delivering global filtering to a number of schools, you’re always going to get – and we were constantly getting this – is one school saying ‘Oh, actually, can you unblock that, because we need to use that particular website for...’ and other schools saying ‘Oh, we don’t want that, we don’t support this for our children and can you block that?’ As an RBC, we’re always... [trying to] keep people happy and looking at solutions that can give that bespoke system to every school.”
(RBC e-learning manager, North)

While many teachers and ICT co-ordinators felt local authority filtering to be overly stringent, the RBC view is clear: filtering is in place because schools and teachers want it. Indeed, according to survey data, 19.9% of teachers ‘strongly agree’ and 38% ‘agree’ that more limits should be placed on what websites can be accessed in schools:

“The reason you have filtering set to a certain level is because that’s the place where the teachers, who are those responsible, feel comfortable at the moment... They feel they’re in a position where, if you like, they’re protected from what would happen if someone found an untoward site. So therefore that’s a safe place for them to be and that’s their comfort zone and that’s where they want to go.” (RBC technical consultant, South)

Local authorities and RBCs nationally are spending a good deal of time and money preventing pupils from using proxy bypass addresses to access blocked material. Indeed, this was a strategy that RBC leaders have had to adopt:

“...the biggest area where we’re sort of doing more in this area is looking at what we can do with the https traffic, which is what some of these sites are starting to deploy. We’re having loads of problems trying to deal with the situation of [when] one child in the school gets to be aware of a site. They then actually take out their mobile phone and

text every other child around and this texting can spread across the school, basically within a few seconds. It's amazing." (RBC technical manager, South)

However, RBC managers know what content is sought by these pupils, and do not see most proxy bypass traffic as pernicious:

"...most proxy bypass traffic is not dangerous or deeply subversive, its goal is to open social networking sites at school... 70% of all access through all bypass proxies which went through the grid – because we now know how to detect them properly – is going to MySpace and Bebo. So that means that the reason why they do it was so that they can carry on what they're doing naturally." (RBC technical consultant, South)

4.2.3 Monitoring and educating learners to behave responsibly online

In schools, technical staff perceive that they spend a substantial amount of time policing internet use. Software systems which monitor all activity including keystrokes, rather than simply logging internet pages that are accessed, are perceived by some to be expensive and 'trivially easy to bypass'. (In one school, students reported that every student in Year 10 knew how to activate proxy bypass sites in order to access social networking addresses.) Monitoring systems can send a screen dump to the network manager and freeze the computer when undesirable activity is detected (for example, inappropriate language in a Word document). Alternatively, e-safety officers, with responsibility for educating stakeholders such as learners, parents and staff, are seen as a positive way of addressing e-safety concerns in one Web 2.0 school (W2). However, in other schools monitoring systems have been installed and are seen as part of the set of tools for ensuring safety.

Schools using monitoring software face further issues concerning handhelds and mobile phones. As more schools explore the potential of such personal devices, management of access to the internet and Web 2.0 tools may become an even more complex issue.

There are concerns about students' perceptions of what may be appropriate in online contexts, and recognition of schools' responsibilities to educate:

"The children need to know that if they kept a secret diary and wrote defamatory comments about a teacher and kept it under their pillow, nobody would ever know. If they put it on a social networking site, which, from a child's point of view, it might to them be the same form of secret diary, they're actually making that information available to a

wider audience... I think that issue of audience and purpose and context is something that we probably have a social responsibility as a school to address.” (Headteacher, NS5)

ICT co-ordinators have taken a lead on embracing e-safety as an aspect of the taught curriculum:

“A lot of the kids do have a slight understanding about dangers but they just put it at the back of their mind... I do think that doing the unit in school helps them to get that message further into their head, ‘cos they just think ‘Oh, yeah, it’s just something people say’ – but they still don’t think twice about clicking on someone who says they want to be their friend and making them into their friend. So it’s just us making them think about the privacy issues and not giving out their real address, not giving out their real contact details.” (ICT co-ordinator, NS2)

4.2.4 Cyberbullying and other worst-case scenarios

Some staff are concerned that students could abuse the technical systems by planting inappropriate material on staff machines or engineering situations such that staff send inappropriate communications to students. In turn, some local authorities have also expressed concerns about one-to-one email contact between staff and pupils, and child protection issues.

There are also privacy/safety concerns about the use of public forums and the possible traceability of children, as well as concerns about sharing passwords:

“It’s that privacy aspect of all this Web 2.0 stuff that’s the thing that worries me the most... the privacy side is really crucial.” (ICT co-ordinator, NS2)

In some cases, bullying via technology was perceived to be easier to manage as it is often easy to trace the offender, particularly if the offence is committed onsite. In other cases, the use of social networking sites and chat rooms outside of school premises and school hours was perceived to be more likely to spill over into school. Generally, staff do not believe that this issue inhibits the development of Web 2.0 tools to support learning and teaching, at least not when the tools are under the control of the school (that is, a walled garden approach).

Headteachers express very serious anxieties about issues of cyberbullying, but some see it is a bullying issue like any other and hence subject to existing policies and procedures rather than requiring special attention. Headteachers are also concerned about child protection and other aspects of e-safety, though this tends to be at the level of general awareness, and specific reported instances of problems

are relatively rare. One headteacher expressed concern in relation to targeted advertising through social networking sites, following substantial media coverage.

One headteacher (school W4) noted that fears about hackers obtaining confidential information can act as a deterrent in developing the uses of technology to support learning and teaching (that is, facilitating access outside school can increase the risks). However, he pointed out that in practice there was little evidence that this was an issue. Similarly, staff in school W2 had the same opinions, noting that the concerns were often raised by local authority staff.

A deputy headteacher in school W8 noted that some parents had expressed concerns in relation to the introduction of a VLE. These concerns largely centred around cyberbullying, MSN and social networking sites, and a perception that the school had a part to play in addressing these issues.

Further discussion of e-safety and security issues can be found in the project's fourth report, *E-safety and Web 2.0*.

Key points: E-safety and security

- Practitioners and RBC managers shared the belief that parents as well as schools must be engaged with e-safety in order for responsible behaviours to develop, and expressed concerns about the current level of parental engagement.
- Although 58% of teachers surveyed wanted tighter internet controls, a large number of teachers reported frustration at being unable to access websites due to RBC/local authority and/or school filtering systems. Not all staff were clear about how to unblock sites. While many teachers and ICT co-ordinators felt local authority filtering to be overly stringent, the RBC view was that filtering is in place because schools and teachers wanted it. RBC managers do not see most proxy bypass traffic as pernicious as they know these are generally attempts to access social networking sites.
- In addition to cyberbullying worries, practitioners expressed concerns about password sharing, the use of public forums and the possible traceability of children.
- Ultimately, the goal of all educators was that learners should become aware, responsible and safe users and generators of internet content.

4.3 Technical issues

4.3.1 Ensuring sufficient access to IT

In several schools, mention is made of considerable recent investment in technology, sometimes supported by specialist status, and hence its generally good availability

for teaching and learning. Where computers are organised into suites, however, there are reports from some subjects that access may be problematic, owing to use of the suites for ICT subject teaching.

Sufficient access to technologies is an enabler. Some Web 2.0 schools (but not all) described high levels of ICT resourcing, particularly to support teachers (data projectors in the classroom, laptops or PCs for teachers, some provision of interactive whiteboards) but also to support learners. In one school (W6), for example, there was a computer/pupil ratio of 1:4, although surprisingly teachers noted that some pupils complained that access outside lessons was poor. (This related to staffing and logistical issues which meant that not all computer rooms were opened at lunchtime.)

Some staff reported that their classroom computers were too slow to run processor- and memory-hungry resources such as simulations and games. A school network manager commented that, in his view, Web 2.0 was "...a lot more demanding ...on the network, on the internet connection...", though not all teachers shared this view, and the same could be said of Web 1.0 use of video and picture downloads.

Some believed that students' personal technologies should be used as resources:

"I'd like to see... that we will use more and more of the technologies that they use at home, and that includes text as well, and their mobile phones..." (Headteacher, NS10)

Although in most schools there is a ban on mobile phones, or at least a 'switched-off and out-of-sight' policy, in many cases the educational potential of these technologies is acknowledged. One headteacher placed Web 2.0 in a wider context of technological development, commenting:

"The trick is not the technology itself, the trick is how you *use* that technology... I think learning is realistically about communicating ideas between each other – in order to understand something you have to have some sort of communication about it... Technology now allows you to have a much better way of maintaining that interaction, not just in the classroom in terms of the way in which you can display information and the way in which people can access the information, but also at home... you can now talk to people... when you're not in the same room but still have the resources there. So I think in that sense it's about how you use the technology to benefit learning... If it's communication technology, then the chances are it will enable you to enhance learning somehow..." (Headteacher, W2)

School W7 has chosen to develop its own solutions internally with regards to supporting teaching and learning. The resulting challenge relates to interoperability issues. Currently, there are a number of separate systems (learning, online reporting, email) which do not communicate with each other. The network manager is investigating alternatives but some of the solutions identified are (inevitably) more complex to use, which is an issue that needs to be resolved.

4.3.2 Bandwidth

Although Web 2.0 can be very resource-light, widespread use may require a certain level of infrastructure. One co-ordinator expressed concerns about the available bandwidth should VLE use really take off, and a network manager noted that his school would soon need to move from 8MB to 16MB broadband to accommodate the additional traffic going 'up' to the VLE, the great majority of which will be student-generated.

Lack of bandwidth is seen to be a barrier as schools begin to access large files over the internet, as well as uploading and downloading large files internally. Podcasting and simulation/virtual reality software can be particularly demanding on bandwidth. In one example, a local authority contacted a Web 2.0 school to notify them that they were using an exceptional amount of the shared bandwidth: they were running a 3D virtual reality simulation in a lunchtime club. In one Web 2.0 school, the increasing use of the VLE, hosted externally, is already causing concerns. While outage is infrequent, technical staff monitor the situation carefully; the school has already opted for two broadband lines and is investigating load balancing in order to maximise resilience. In another Web 2.0 school, still at an exploratory stage, insufficient bandwidth has already become an issue and a barrier.

One RBC technical consultant had an ambitious scenario for a Web 2.0 future:

“Storage? Well, it’s a small matter of finance... the learning platform that we’re putting in will start off with two terabytes’ worth of user storage space as a minimum. It can go to 20 without having to put any new physical infrastructure in place, so it’s designed to cope with those sort of sizes. It’s enterprise-scale stuff. It’ll be one of the largest implementations... in the world when we finish it.” (RBC technical consultant, South)

But not all RBC leaders were so upbeat about bandwidth:

“...we’ve got to be very careful, because, you know, all these technologies... if it becomes successful, it’s going to kill you... because your network just grinds to a halt. We tend to have a stepped approach... What we’ve done is what we call throttled back, reduced

the bandwidth available to video conferencing to 3 or 4K, because we're very aware, even at this moment, the authorities are reaching their maximum bandwidth... they're hitting up to the sort of 90 to 94% sometimes." (RBC e-learning manager, North)

However, even though running out of bandwidth is a concern, the same RBC leader also saw an ever-increasing appetite for bandwidth as an indicator of success:

"Generally, you know, round about the 80% mark, we'll get some real worrying peaks. Some really exciting peaks, actually. It depends which way you look at it. Our technical people say 'Oh, it's a disaster.' I'm maybe thinking 'Well, that's brilliant... it's not just internet traffic they're using this for, it's a lot of other things...'" (RBC e-learning manager, North)

National RBC leaders are also looking beyond current usage levels:

"We started off with two meg in primary and 10 meg in secondary. Now we're finding that most if not many schools are going for 10 meg at primary and 100 meg at secondary. It's the new electricity, you know? It's like everybody expects it to be like a light switch, you click on and it's there – no longer a luxury." (RBC content manager, South)

4.3.3 Access to technical and administrative support

Despite the fact that it is now a given that schools need to have seamless access to a wide range of tools and hardware resources, with powerful networks linking schools, homes and other services to management systems and VLEs, in some schools, insufficient levels of technical support including specialist support for the Web 2.0 tools is still a barrier to staff uptake. Issues of back-up systems and control of content – when, for example, using third-party services – were not systematically addressed by practitioners. One network manager voiced concerns about the storage issues:

"I was talking to one of my technicians last week about how much file storage you'd need for 16 years of education... Do you put everything on? I don't think anyone's thought about this as much as they should, really... What are they going to be involved in outside school, and how should we support that?" (Network manager, NS6)

The technical implications of anytime-anywhere access are concerns held by RBCs:

"Coming back to the 'all access' thing, we provide IDs for all 1.2 million users, so we could at any particular stage know who was logging on and where they're logging on from. We allow automatic access by IP

address if they're in school as long as they're not going into a personal area, in which case they always need to log on with their username and password." (RBC content manager, South)

Not only technical support, but administrative support, is required for implementation (for example, setting up groups to participate in discussion forums). The use of some Web 2.0 tools requires users to register. This was reported to take 1-2 lessons by staff in two schools. In some cases, this acted as a deterrent to further registrations but in others staff believed that with experience the process would be much less time-consuming. For some teachers at one Web 2.0 school, the need to set up class lists for each discussion forum, which took some time, was a deterrent. This administrative barrier was being dealt with both by employing a member of staff to take responsibility for this task and by seeking a more efficient technical solution with the commercial provider (for example, facilitating importing class lists from a management information system). One Web 2.0 school has halted further development until an appointment has been made.

In two Web 2.0 schools, individual staff host and manage the blogs and podcast sites, thus relieving the technical support staff of any responsibility other than ensuring that the site is not blocked.

Key points: Technical issues

- Access to technology was felt by teachers to be crucial for effective Web 2.0 use.
- In some schools, barriers included insufficient access to computer suites (where ICT subject teaching predominates), insufficient levels of technical support (including specialist support for Web 2.0 tools) and/or insufficient bandwidth. In one school (W6), for example, there was a computer/pupil ratio of 1:4, although surprisingly teachers noted that some pupils complained that access outside lessons was poor.
- The most active Web 2.0 schools had high levels of ICT resourcing, particularly in terms of staffing to support teachers as well as learners, though it should be noted that more widespread use of services can increase the administrative overhead on teachers and the system.
- Adequate bandwidth is essential where schools need to access large files over the internet and to run simulations and podcasting. RBC leaders are looking to significantly expand bandwidth beyond current levels as some schools consume up to 94% of their allocation.
- Issues of storage, back-up systems and control of content were addressed by practitioners in different ways – some through local control, others through buying into a regionally managed system. The desire for some secondary schools to maintain their autonomy in this area was still evident.

4.4 Other implementation issues: Legal, content, portability

4.4.1 Legal issues

RBCs need to give a good deal of attention to legal and related issues, not least because they risk being the target of litigation if they fail to do so. Firstly, there are issues connected with child safety:

“The real bottom line is that, you know, whatever the kids do, it comes down to the headteacher and the governors, so we have to make sure we give them good advice, the right advice, talking about the use of it. We’re always talking about having the permission forms and not taking photos of kids, and then there’s no surname... they haven’t got the three elements that can identify that child if it ends up on the web and things like that.” (RBC e-learning manager, North)

In relation to publishing work, the need to obtain parental permission (for example, to display pupils’ artwork) is seen by some teachers to be a barrier:

“...having had a great big file of [pupils’] work that I could download onto this site, I thought... now I’ve got to get permission from all these people, from their parents. So I’ve got to write a letter, I’ve got to send it home, I’ve got to wait for it to come back... If it’s not easy, it just gets put by the wayside because, you know, putting students’ work on a virtual gallery is nice but it’s not going to make people get A* grades at GCSE.” (Art teacher, W8)

Of course, this could be addressed through a whole-school policy and indeed is what happens at some schools (parental permission is obtained for publication purposes when a child joins the school). Perhaps this is a disadvantage of the organic, bottom-up approach – school management needs to be involved to some degree and to intervene when barriers that can be easily overcome need to be addressed at school level.

RBCs contend with a number of issues related to copyright and intellectual property, and here RBC leaders have been taking positions aimed at making life better and simpler for schools:

“Everything is copyrighted [by the RBC]. We operate under a creative commons program, like all the other RBCs. We’re quite happy for people to use any content we produce, or refer to it, providing they’re not doing it for commercial benefit and providing they acknowledge the source. Really we need to be in a position where students and children don’t assume that because it’s on the internet, therefore it’s free, because somewhere along the line somebody’s going to make a case

that a user has broken the law. I mean the reasons we did the deal with the music files [with a digital music asset company] is that it gave students the licence to download, to use in their presentations, their personal work, their examination work... they could scratch and edit if that's what they wanted to do. So we try and go out and find digital asset libraries that enable us to do two things. First of all, allowing students and teachers to work safely within the law, within the licence. Secondly, to stop them going onto Google Images and ending up with something which teacher, parent and child would rather not see." (RBC technical manager, South)

"This approach is adopted at local authority level so many schools will have access to local authority and RBC asset collections. We give people guidelines on what they can use. We're providing them with copyright-free sound files... with sources of copyright-free images and so on... and within the gateway there'll be – they don't know this yet, because it's not been announced – but we've signed a contract with a company to provide us with some copyright-free video material, with an editing tool so that they can make their own videos and add voiceover and text on screen. So we're doing our best, just say, make sure you're, you know, legally clean, but also providing them with resources enabling them to do that... We're also adding our own material to these galleries which we're quite happy to share... across country in return for other local authorities' own, you know, materials." (Local authority e-learning adviser, Midlands)

With regards to legal issues and addressing copyright issues when using resources from elsewhere, only one member of staff from all those interviewed raised this explicitly (an ICT teacher, school W7). This perhaps suggests a lack of awareness of this issue which may need to be addressed through stronger policy directives. This teacher remarked that he had undertaken a software engineering degree, which had covered legal issues. He indicated a general awareness of legal issues and responsibilities in relation to students' data, but also referred to storing international data and the need to adhere to those countries' legal requirements.

This teacher also described a particular case where legal/copyright issues proved to be a barrier to the continuation of a school-run internet radio station. The initiative ran for six months with students acting as deejays. It was fully licensed to play music and students helped to put together radio shows each week covering entertainment, arts reports and reviews. With advice from legal experts in broadcasting, the teacher obtained documents which offered guidance on the licensing requirements but they were strict, requiring that the three looped hours of programming had to be changed

weekly and that you could not repeat a song during this period. This proved to be too demanding, particularly on the teacher's time, and so the initiative ended.

The only other references by staff to legal issues related to e-safety (not having open access to the internet) and requiring pupils to sign acceptable use policies to satisfy legal obligations.

4.4.2 Content issues

Plagiarism (in terms of students plagiarising the work of others) is not an issue that is particular to Web 2.0 technologies and many staff interviewed noted this. Of course, technology makes it easier to plagiarise as pupils can copy and paste from sources (including sites with off-the-shelf homework and coursework). Staff views varied from those who were confident that they would detect plagiarism simply because they knew their pupils so well (Teacher, school W10: "You see it in their eyes that they've been found out."), to those who considered it to be currently a major problem. One approach to overcoming 'copying and pasting' from websites is to structure the tasks carefully with writing frames. Similarly, a headteacher (school W4) commented that it was important to be very specific about the task when using web-based sources, and that policies regarding plagiarism needed to be developed. One headteacher also perceived a tension between government policy and the concerns of awarding bodies:

"What the government want by 2008 is that students have an area that they can upload their work to that everybody can share. Yet we've getting increasing information from the exam boards talking about plagiarism and saying please do not let students have access to other students' work." (Headteacher, N8)

In terms of the collaborative activities that Web 2.0 tools facilitate, only a couple of staff raised issues surrounding intellectual property rights and plagiarism in relation to the ideas and work of some pupils being adopted by peers:

"Well, I think there's a lot there for the collaborative... you know, the collaborative side to education. I suppose in that sense there's a blurring then of what's your work and what's somebody else's. And the intellectual property side of things... and plagiarism becomes a very difficult thing, doesn't it? If you're not careful, you end up with... someone puts a bit of work out there, everyone comments on it, but then they claim that to be their own." (Geography teacher, N6)

At school N9, it was reported that pupils' areas on the shared drive had been configured such that no other pupil could save anything into a pupil area or copy anything from it in order to prevent plagiarism between pupils. The lack of comment

relating to this aspect suggests that this issue is not at the forefront of many teachers' minds, perhaps because this innovation is in such early stages. One teacher was more mindful of this issue but felt that classroom management and the development of trust between staff and pupils was the way to overcome this potential issue. In her school (W6), exemplar essays are uploaded into discussion forums, and previous discussions about key texts in English are available for subsequent cohorts to look at:

“My view on plagiarism is that as a teacher, if you know your students, you know when something is not their work. It's obvious – it really is – every student has their own style. Then it is easy to find out because you search on a key phrase. I have said to them, ‘Look, those essays are there, don't plagiarise them – if you do, I'll be able to tell.’ If they have faith in you as a teacher, they know that. There needs to be a degree of trust there. You need to make them aware there are consequences if they do.” (English teacher, W6)

Similarly, only a few staff referred to issues relating to the plagiarising of their pupils' work by others outside the school in context of publishing work on publicly accessible sites. For example, a design and technology teacher at one school (N6) said that exemplary work is published on the intranet but not more widely due to a perceived ‘danger’ of plagiarism.

4.4.3 Portability issues

The issues of transition and portability were mentioned only rarely by RBC leaders: in one case, video podcasts of ‘the best bits of Year 7’ were posted on a guest-accessible area of the school VLE, to be viewed by potential pupils from junior schools (and their parents); in another, a network manager reported a conversation about the complex issues that would need to be addressed if every student in the country were to be given access to a 15-year developmental e-portfolio. A senior local authority expert reported that these issues are indeed currently being reviewed and considered by a national planning group.

Single sign-on is seen to be an important issue in one Web 2.0 school as managing multiple passwords for pupils is not seen to be realistic. Similarly, accessing multiple resources separately is seen to be a barrier; rather, all online resources should be available (preferably via a single sign-on) from a single point of access (that is, embedded within the VLE). Two RBC content and technical managers described plans to implement single sign-on workspaces that could potentially be retained by students upon leaving school.

Key points: Other implementation issues

- Most teachers lack awareness of legal and copyright issues when using external resources, as indicated from their lack of consideration in teacher interviews. Legal/copyright issues were a barrier to one school's attempts to implement podcasting. There are policy implications for staff training and teacher development here.
- RBCs deal on schools' behalf with a number of issues related to copyright and intellectual property, and take positions aimed at facilitating schools' access to asset collections. Staff rarely raised issues of intellectual property rights and plagiarism in relation to the ideas and work of pupils, despite the relevance of these issues to collaborative activities.
- Transition and portability were a concern of RBC leaders and were being addressed through developments in single sign-on workspaces and authentication of up to a million users, many of whom would have a unique user name carried throughout their school career, but these issues were rarely considered by schools.
- For the future, it seems likely that schools will need to have access to both bottom-up, locally managed and top-down, regionally managed strategies for data handling. Parental permission, for example, will generally need to be local, while asset management is likely to be more cost-effective when scaled up to regional level.

4.5 Processes of innovation: From the innovators' perspective

4.5.1 Motivations for Web 2.0 innovation: Individual innovators and innovating schools

In interviews with individual innovators, three recurring themes emerged concerning where their interests arose:

- An engagement with technology more generally
- A particular form of technology experience that centres on communication (such as weblogs or blogs)
- A motive to enhance their teaching.

A prevailing model of educational innovation (particularly in relation to ICT) is that it can best be cultivated by seeding possibilities within small cohorts of individual practitioners at the local level as the outcome of contact with designed training: for instance, a course, a workshop or an online training resource. It works best when there is also in place a process of dissemination within the institutions to which practitioners return. Such a scenario or development was unusual in the sample of individual innovators interviewed. Only one reported roots that suggested this model:

“Well, the deputy head started it all... she started it all very much when she went to the original innovations discussion forum on what innovation is all about.” (Innovator 1)

Aside from one innovator who completed a European Computer Driving Licence (ECDL) course, one of the only sources of formal educational experience that was invoked was an isolated viewing on Teachers TV about blogs. One informant identified a personal postgraduate course as one source of inspiration. However, this individual also commented:

“I love sort of technology, I suppose, and just started playing around... and then once I'd got my own server, it was just like ‘Well, actually this would be a great thing to do’ and I started using [it].” (Innovator 2)

Although singular episodes of contact might be important, they gain their importance through being part of a system of organised interests and experiences. A more common route into innovation for the individual innovators sampled seemed to arise through more self-organised forms of motivation. There is a strong sense of development driven from bottom-up processes, rather than dictated by top-down prescriptions. Although in-service training, postgraduate courses, workshops and media advocacy could play some part in these Web 2.0 biographies, the main drivers seem to be located elsewhere. Being comfortable with technology is one good predictor of interest, but it is not a strictly necessary pre-condition.

A general orientation to advancing one's practice seems key – usually as measured by stimulating or refreshing the engagement of pupils. Of course, this is an attitude that is self-reported and it is possible that all practitioners are inclined to describe themselves in this manner. However, their descriptions were often interspersed with credible examples of a trajectory towards Web 2.0 that involved previous investment in innovation.

A crucial driving factor was a sense of community that had been stimulated by noticing the innovation of other teachers and, sometimes, having one's own innovation brought into view for them. In short, the collaborative and publishing tools of Web 2.0 serve not only as the content of innovation but also the medium in which that innovation is exchanged, noticed and rewarded.

The informants make it clear that becoming a member of a community of practice can be crucial in increasing the awareness of possibilities. One innovator relates this to his personal history:

“I'm sure I wouldn't have thought of half the things I'm trying if I hadn't been reading other people's blogs, if I hadn't been blogging myself, if I hadn't been a member of the forum. And there are probably some

things that I wouldn't have risked trying if I hadn't have had someone to talk to and been able to say 'Well, how did this work for you? What do you think of this idea? Is it going to work or am I setting myself up for a fall?' And there were people in the school I would go to with the same questions, because obviously there's a school context to it as well, but having those people outside and a very supportive community to plug into has, I'm sure, probably doubled the amount of things that I'd be willing to try." (Innovator 3)

In some Web 2.0 schools, the process of innovation is generally characterised as starting from a practical problem rather than the technology (whereas others have found themselves with a particular technology and explored how it can suit their needs best or simply explored a range of tools available and integrated them where possible). In school W7, the process began with a desire to engage students, using action research to help drive change. Similarly to the individual innovators, at Web 2.0 schools staff driving the innovation are constantly thinking about better ways of doing things and finding technological solutions:

"I've been in a lesson with the tablet manager [female staff member] and she's saying we really need a method of feeding back to kids here, instant feedback say. Well, a blog does that, doesn't it? Okay, let's get a blog in here. We really need a bit of instant messaging here... other various bits and pieces... It came out of a need of staff saying 'Wouldn't it be great if...?'" (Deputy headteacher, W7)

In the Web 2.0 schools, sometimes the penny drops when you see someone else doing something. This signals the need for dissemination and sharing. The deputy headteacher at school W7 was not particularly interested in blogs until he saw:

"...30 kids could access each other's work instantly... that started ticking boxes for me, saying that's a really good thing to get into here, that's a really good peer assessment device."

Some staff are more aware of others of how to identify possibilities:

"[from] all sorts of sources... from what other people have done, going on courses... I don't know if I would've heard about [the VLE] being in another school... word of mouth as well. I look on the web, I look at free downloads, stuff like that... see if anything is of use and take it from there really." (MFL teacher, W7)

In some cases at Web 2.0 schools, driving forces are professional development activities of individual staff members (for example, studying for a masters degree). These staff have a vested interest in leading innovative projects. Equally, many of

the developments are undertaken by staff who are interested in technology and prepared to invest their own time in developing resources (and in some cases technological systems).

4.5.2 Developing a context for innovation: Individual innovators and innovating schools

A second theme in the discussion of individual innovation concerned the local context in which activities were being developed. This arose as out-of-school context (parents) and in-school context (school culture, staff and ICT infrastructure). None of these contexts were central to all interviews but they each arose in several conversations.

One teacher realised through pupil commentary that a pupil had been excited and empowered by online activity with blogs. This had a powerful effect on the teacher and brought to light the out-of-school context:

“Reading that and then at parents’ evening showing it to the parents and you can see them nodding and wanting to pat me – I’m hopefully not seen as an arrogant person – but I could tell they wanted to say ‘Wow, that’s why we send our kids to this school’, because you can’t get anything better out of a lesson. That one sentence summarises what they did in your classroom. But colleagues may be being worried that that’s not the response they’ll get.” (Innovator 7)

The final line of the above quote warns that such judgements could potentially be a divisive force within the professional community of the school, highlighting potential tensions between contexts.

Staff context was key to individual innovators: they often identified the importance of supportive management to their success. This might be a matter of line managers being encouraging:

“She [department head] gave me the thumbs up. I mean, I’ve spoken to people who would love to try these things, but the institution blocks, puts barriers in their way... and I do consider the fact that I’ve been very lucky to be working in a school where my head of department all the way up to the headteacher have very much said ‘Yes, try it out, keep us informed...’” (Innovator 3)

Supportive staff context might be a matter of having access to a sympathetic and competent team of ICT support staff:

“I mean, as I said, we’re a very, very lucky school because we can afford to have... an IT development team, of which we currently have

four members of the development team plus we have three members of a general IT team, so we've got seven members of an IT team and they're non-teaching staff – they're purely IT.” (Innovator 1)

On the other hand, the same staff contexts could also be associated with obstruction and the perceived undermining of initiative:

“I have a constant battle with the senior management team... I've become very paranoid that I see every single thing in school... every time something happens I see it as a kind of slight against what I've ended up trying to use... I think the problem is that my colleague has seen whenever I've used anything that does not enhance those skills... she sees it, calls it playing. She's not backward in coming forward – she says things like 'We don't teach the kids IT any more, they just play.’” (Innovator 7)

However, it was unusual to find individuals who seemed seriously deterred from activity by this form of local management or colleague scepticism. Some seemed distinctly empowered by the more positive and opposing attitude.

In many cases, it was clear that a school's ICT infrastructure was an important contextual factor in encouraging innovation. The VLE and its functionalities could be key (a tension discussed further in Section 5.1.1):

“I suppose the main thrust has been the learning platform. About two years ago we were going through the process of looking for a learning platform and we were struck by the ease of which you can use all this technology within the [product] pages. So when we did the training with them, that introduced us to building these [Web 2.0] pages... So I think the sort of initial thrust really came when we signed onto the learning platform and found all the sort of interesting things which we could do with the youngsters overall.” (Innovator 4)

The importance of the contexts of school culture and staff attitudes comes to the fore when evaluating innovation processes at Web 2.0 schools, particularly in terms of institutionalising, in some way, the contribution that an individual is making and sharing the benefits of this throughout the school. In one school, a strategic decision was taken to give a mathematics teacher who is knowledgeable and enthusiastic about Web 2.0 a responsibility allowance as 'e-learning co-ordinator' to look into 'wikis, podcasts, blogs... the latest stuff, and to see how we can integrate that into school'. In other schools, strategic appointments have been made to ICT co-ordinator positions, with particular current emphasis on investigating and where appropriate implementing Web 2.0 approaches.

However, staff changes can have a major impact when key drivers move to new posts in other schools (a commonly identified barrier to innovation and change, both generally and in relation to ICT to support teaching and learning). Staff development opportunities, therefore, also play a key role in the process of innovation at Web 2.0 schools. At school W7, for example, there are five days of continuing professional development (CPD) to support staff using the VLE, which take the form of many sessions run by different people which staff can elect to attend (they were reported to be always well attended).

Even in Web 2.0 schools, contextual barriers exist to innovation processes. In one such school, a member of staff commented that there were limited opportunities for dissemination of good practice which she felt was inhibiting the development of Web 2.0 tools across departments.

Key points: Processes of innovation

- Innovation was most commonly identified as starting at the individual and local level, though management support could greatly facilitate the embedding of change.
- Individual innovators' experience indicated that becoming a member of a community of practice can be crucial in increasing the awareness of possibilities. A general orientation to advancing one's practice seems key – usually as measured by stimulating or refreshing the engagement of pupils.
- Supportive staff context might be a matter of having access to a sympathetic and competent team of ICT support staff, as well as encouraging (or non-obstructive) management and sufficient ICT resourcing.
- Staffing changes could have a major impact when innovators moved to new posts.

4.6 Training, support and leadership

4.6.1 Training and disseminating good practice

More than a third (36.9%) of teachers report that they never receive training in the use of new technologies including Web 2.0 – 26.7% say they only receive training 'rarely', 41.1% believe that their students are more confident with Web 2.0 technology than they are, 37.4% believe adopting Web 2.0 resources would be time-consuming for them, and 56.3% of teachers would like more guidance in the use of Web 2.0 technologies. That teachers' use of Web 2.0 technologies exceeds their current use of these tools in schools suggests that growing familiarity with these tools may make their school use increasingly likely. Unsurprisingly, lack of technical skills and/or confidence is still a barrier for many staff and this is clearly affecting

whole-school take-up. However, there are communication skills that teachers may need to develop in relation to Web 2.0 tools, such as directing and facilitating discussions.

Headteachers in many cases recognise the importance of – and time needed for – training:

“...in a sense, it’s back to front – we’ve given them the hardware... you know, it’s vast, basically you’re given the money and therefore you have to spend the money. It’s a roundabout way and now you say use it, because if you don’t use it, you’re gonna lose the skill or it’s not going to impact in the classroom... and you’ve got to marry that with how you’re gonna train your staff.” (Assistant headteacher, NS14)

In some cases, there is clearly a need to reach the ‘tipping point’ in regularity of use:

“I don’t use it enough to remember what I did the last time that I did it. So if I go on and I try to load something up, I’ve forgotten what I did the last time... and therefore I have to ask [the e-learning manager] again what to do.” (Art teacher, W8)

One normative sample school had an ‘expert group’ to share and disseminate good practice. Similarly, in one Web 2.0 school, cross-department focus groups were perceived to be an effective means of cross-fertilisation. In another Web 2.0 school, use of discussion forums had developed through carefully managed working groups, led by an enthusiastic curriculum specialist. The discussion forum champion held meetings to engage staff interest and continued to support those who wished to take it further, either individually or through group meetings. However, the member of staff leading the initiative reached an impasse in further development as she did not have time to support additional members of staff. The solution identified was to employ a dedicated technical support staff member to offer administrative and technical support to all staff using the VLE.

Individual innovators often conveyed an understanding that these innovations would only work if they were built into the fabric of a school (or classroom). In other words, such new activities needed to find continuity with existing ambitions and needed to be fully integrated with their local context of teaching and learning:

“I mean if we’re talking about the fact that even if we’re mentioning the word ‘bolt-on’, then we’re talking about a curriculum that has something added to it, you know, rather than it being integral.” (Innovator 18)

The overriding belief from innovators was that staff needed reliable but informal sources of support within the school and from among their colleagues:

“I think that from the examples that I’ve seen of people doing this around the country, it seems to be that you have to have this sort of, if you like, an evangelist in the school to help give people support. Because it’s all very well getting stuff off the web, that’s great, but actually if you have someone next to you saying ‘Oh yes, you do X, Y and Z’... I’d even, you know, use the term revolution. Any sort of revolution like this, I think that, you know, has to come from the grass roots and it has to take time to trickle through.” (Innovator 11)

Innovators commented that it was important that any such training and support came from the bottom up and not as a top-down prescription. Moreover, it was probably wise to start from modest aims in the first instance. Of course, Web 2.0 can be the medium of sharing good practice as well as being the tool which is shared: 32.5% of teachers say they frequently or occasionally use Web 2.0 to share resources and ideas with other teachers, suggesting some appetite for this.

RBC managers perceive great need for further training of teachers, and the aspiration is there. Individual innovators were identified as a key factor in training and teacher development, particularly in terms of input from new entrants to the profession:

“Creative teacher innovators (many of whom are new entrants to the profession) are also crucial for encouraging change and modelling innovation... There are two teachers [at a primary school] who have created, recorded their own videos... Now, we weren’t involved in that, but they’re the kind of people, looking at them in the terms of their age group, where they would have taken a video and uploaded it into YouTube or into MySpace. They’re transferring that technique that they got from outside school into the VLE we provide...” (RBC content manager, South)

4.6.2 Time pressures

Optional courses, though offered to teachers, may not be taken up owing to pressure of time. Time is, unsurprisingly, one of the main barriers to the integration of Web 2.0 tools in teaching and learning. One school reports that it has had a web portal available but has not found the opportunity to train staff and students to use it. Staff need time to experiment with new tools and identify how they might be used to support teaching and learning, as well as to find and/or develop resources. Currently, ‘spare time’ is often devoted to additional classes and ensuring that the curriculum is covered fully (as ensuring that pupils pass exams is the key goal), or to mastering uses of technology to support administration. When staff are able to innovate, there is limited time to disseminate and share good practice, which is inhibiting e-maturity:

“Getting the teachers involved is the hardest thing. Not that they don’t see the value of it, but they are snowed under what with being dedicated teachers.” (E-learning co-ordinator, W11)

“Sometimes it can take a lot of time to have to go through it, time we don’t have, to go through it, to go through and discover the pitfalls before you present it to the class so that it runs smoothly. There are lots of pitfalls, I find, just the simplest of things – whether it’s going to work, the internet’s going to work or this is going to work or the links will work... not only whether it will work for them in their learning.” (MFL teacher, W4)

Lack of time and/or support for creating resources is a perceived barrier. For example, turning past exam papers into interactive resources for one particular VLE can be extremely time-consuming; provision of these by exam boards or tools within VLEs to facilitate development would be useful.

Even technically competent staff have concerns about the amount of time required to set up and manage activities using Web 2.0 tools:

“Once you’ve lots of blogs... it becomes almost a chore to look through it.” (ICT teacher, W2)

The time investment required is not always seen to be beneficial. Furthermore, it is frustrating when resources are developed but then can no longer be accessed:

“You put so much work into it and then everything changes, everything updates, and then it’s like, right, OK, how do I go forward now? I haven’t got time.” (History teacher, N7)

A number of individual innovators referred to the problem of finding time. Most colleagues were judged to be constrained by responsibilities that left them no space for such innovation. The innovators themselves admitted that being a Web 2.0 enthusiast could be very time-consuming. For example, it was suggested that the uploading of teaching materials was something that could be mastered and managed fairly quickly and, once done, it might not seem so urgent to go further with online technology. Colleagues were seen to be left very short of the space to fit in more participatory forms of online activity:

“The big obstacle really is time rather than interest. The members of my faculty, apart from one, are people who are towards the end of their careers and they’re still interested in it, so when people say ‘Oh, you know, they kind of, they don’t want to know, I don’t think’, in many cases I don’t think that’s the problem. The problem is often time and

I've tried to use some of the time that was given to us to look at the possibilities of, you know, not only blogging but all the Web 2.0 tools.”
(Innovator 10)

Unsurprisingly, lack of technical skills and/or confidence is still a barrier for many staff and this is clearly affecting whole-school take-up. However, there are new communication skills, such as directing and facilitating discussions that teachers may require in relation to Web 2.0 tools. Therefore, schools seeking to introduce Web 2.0 tools should be mindful of the range of skills which will be required (depending on the tools selected) and should provide appropriate training to ensure that teachers are equipped to make full use of the technology.

4.6.3 Provision of technical support

Several staff with responsibilities for the co-ordination and development of ICT use in their schools comment that, for some teachers, a fear factor or risk aversion still inhibits their use of technology. To create and manage activities involving tools such as blogs, podcasting and wikis requires some degree of confidence and technical skill (not necessarily difficult but off-putting for some):

“I can send people on any type of course, a million courses... and skill them up, but if I don't work on the attitude, then I'm not going to get anywhere.” (Assistant headteacher, W2)

Local authority and RBC leaders believed that if there was a time when teachers were expected to contribute content to local authority or RBC websites without technical support, that time is certainly past. Teachers are no longer expected to upload content without support:

“The sort of vision, really, is that each school would contribute to the central pool of resources, some really good idea... We've recently appointed a pair of people who would then turn that into a very appropriate screen, with images and so on, and make it work really well... It enables teachers to say 'Yes, I've got a good idea' and even if they haven't got the IT skill to turn it into a decent piece of e-learning, we've got the team to do that. We then put it in the pool and others can draw on it.” (Local authority e-learning adviser, Midlands)

The changing roles of the network manager and the tensions related to autonomy of technical implementation and oversight are discussed further in Section 5.1.3.

4.6.4 Leadership and management structures

Broadly speaking, headteachers locate themselves on a continuum from positive but cautious ('an area that ought to be explored') to keen and imaginative in terms of

how to get Web 2.0 going at home and school. With reference to the range of Web 2.0 technologies, one deputy headteacher commented:

“All of [Web 2.0] is a key form of communication for a significant number of people these days and I have no issue with it at all. It motivates students, particularly when you’re thinking of key subjects like modern languages or English, because it’s what you would do normally. Why would you do it any differently? As long as we have the whole concept of the fact that we don’t tolerate bullying... it could enhance literacy and it could enhance self-confidence and their knowledge of the world outside.” (Deputy headteacher, NS8)

For RBC managers, leadership is ‘crucial’ to overcoming many of the skills issues raised by training needs:

“I think the key factor in teacher development is effective school leadership... If the head is confident and aware of what IT can do for his or her school, then I think the message gets around a lot more quickly than if he says ‘Well, I don’t need to bother, I’ll just leave it with the ICT co-ordinator.’” (RBC content manager, South)

In one Web 2.0 school (W12), the management structure has been revamped so that the head of ICT and the network manager report independently to the deputy with responsibility for ICT, facilitating strategy development from the bottom up. Previously, the network manager had reported to the head of ICT, which meant that some opinions and ideas were filtered to some extent and which was seen to be a barrier to whole-school developments.

Top-down change can occur when headteachers are exposed to visions of how technology, including Web 2.0, can support learning. Two normative sample headteachers said that they had learned a great deal from the National College for School Leadership’s Strategic Leadership of ICT course, one declaring that it had ‘opened [his] eyes’ to the possibilities for change, and that he now saw e-portfolios as a lever for change and personalisation. Some schools are encouraging uploading homework, synchronous or asynchronous chat with teachers about homework, and teacher or peer e-assessment. All such initiatives were experimental rather than embedded, however, and in only a minority of schools.

Staff autonomy and ownership is perceived to be an enabler in one school. Staff with technical expertise are able to access school servers and install software as required. In another Web 2.0 school, however, it was noted that often the drive for innovation comes from the enthusiasts who do not necessarily have the power to bring about change. Thus, it is crucial to have support of senior leaders and

managers. Change management models need to incorporate top-down and bottom-up strategies.

Key points: Training, support and leadership

- Effective staff development opportunities are key to Web 2.0 adoption, and 56% of teachers indicated that they would welcome more guidance in the use of Web 2.0 technologies. More than a third (36.9%) of teachers report that they never receive training in the use of new technologies including Web 2.0; 26.7% say they only receive training 'rarely'.
- Innovators commented that it was important that any such training and support came from the bottom up and not as a top-down prescription. Moreover, it was probably wise to start from modest aims.
- Web 2.0 can be the medium of exchange: 32.5% of teachers frequently or occasionally use Web 2.0 to share resources and ideas with other teachers.
- Time is one of the main barriers to the integration of Web 2.0 tools in teaching and learning. Even technically proficient staff need time to experiment with new tools and identify how they might be used to support teaching and learning, as well as to find and/or develop resources and keep pace with a changing landscape of tools.
- Change management models need to incorporate top-down and bottom-up strategies. Staff autonomy and ownership is an enabler, as is effective school leadership.

5 Choices, opportunities and visions

5.1 Choices

Use of Web 2.0 requires practical choices:

- What platform should host the activity, and should this be on the open internet?
- How should good practice be disseminated beyond current users?
- Who leads technical implementation and support? With dissemination of practice found to be a considerable challenge even within Web 2.0-innovating schools, what options exist for supporting this?
- Considerations about platforms, dissemination and autonomy are key to facilitating adoption of Web 2.0 tools, whereas lack of planning may mean that tools are not used, practices stagnate or unforeseen barriers arise.

5.1.1 Realising a platform for Web 2.0: The changing nature of the walled garden

As schools adopt the use of VLEs, the question arises of how well and how readily they, and the VLEs within them, act as hosts for Web 2.0 activity. Learning platforms are, for many schools, the mechanisms through which choices about autonomy over platforms, software and support are manifested. The choice between a walled garden and access to the open internet has implications for information accessibility, safety and pedagogy, as well as the ability to support informal learning and home-school links. Where flexibility exists, the VLE can be an effective platform for Web 2.0 tools.

This project did not set out to gather systematic evidence of the way in which VLEs are used to support learning and teaching, though nearly all participating Web 2.0 schools did have some form of VLE. To put the point the other way: of the schools that were investigated in this study, only one of them that had moved beyond purely experimental exploration of Web 2.0 approaches did not have a VLE, though it is perhaps the case that a VLE is a facilitator of Web 2.0 activity rather than a causal factor. Some schools have been experimenting with VLEs with varying degrees of success, and some ICT co-ordinators are looking forward to the potential of the next generation of VLEs to support the kinds of working they wish to develop with wider access to uploading and downloading of work and support materials and possibilities for greater personalisation. Clearly, it is possible to run Web 2.0 projects without a VLE, but equally the ability to tailor and manage VLE content can make supporting and monitoring Web 2.0 activity across a whole school much simpler.

The perceived flexibility of one open source VLE has been an attraction for some schools, where much time and effort has been invested, whereas others want the

responsibility for technical support and development to rest outside the school. One co-ordinator reported slow progress with the publication of self-learning materials on the open source VLE, particularly with students working collaboratively via the bulletin board. He reported that this worked better with high-achieving students as some others 'revert to sending silly messages'. Direct student-to-student messaging has been stopped owing to inappropriate and personal content. In some schools, VLE use has focused on older students, with students uploading coursework from home.

One deputy headteacher was concerned that with an off-the-shelf VLE they would pay for functionality they neither wanted nor needed. An e-learning co-ordinator and Web 2.0 enthusiast expressed concern about delegating control to the supplier of a 'big VLE', with implications for feelings of ownership and control over the resulting product:

"It's got to be our *own* place, like it's our own building... our school and we do what we want with it... It would be the same for a virtual place – it's got to be ours, we've got to feel at home in it... If you pay for something that's already all done and that's rolled out to lots of different places, it's going to be less easy to get them to adapt it for you, whereas if you pay someone to look after your own thing..."
(Mathematics teacher and e-learning co-ordinator, high user, NS17)

The issue of functioning with local control versus joining a regional consortium is not new, and nor is it wholly a Web 2.0 issue. In two Web 2.0 schools, however, the use of the VLE has developed in response to exploring the possibilities of the functionality provided. Teachers have seen potential uses and developed these for their own practice, prior to cascading their experiences to other staff in the department. This reflects how flexibility is needed to ensure that ideas can be developed and adopted if it suits the school.

In some schools, teachers expressed a need for more technical support in their use of the VLE to provide the autonomy users require. One deputy headteacher was concerned that staff would need a lot of training and time to get used to a VLE. Indeed, for teachers who do not currently use a VLE, there is a perception that it is more work, and hence there may be resistance because of workload and time issues. However, a network manager responds to this starkly:

"If you can't use IT in the twenty-first century, then you're in the wrong job as a teacher... All the students know how to use it, and if they know how to use it you should be using it..." (Network manager, W2)

In two Web 2.0 schools (W4, W6), the VLE and other technology tools were introduced initially as a means of reaching learners beyond the school walls, bringing in-school and out-of-school learning together.

For most schools, hosting Web 2.0 activity implies a walled garden approach with password-protected content, but this does not necessarily have to be the case. A minority of the Web 2.0-innovating schools enabled some or all of their Web 2.0 activities to be visible on the open internet – podcasts, in particular, benefited from wider publication. A VLE, offering a walled garden, was perceived by school W6 to provide a safe environment in which to operate live chat facilities. Another Web 2.0 school (W12) plans to introduce a walled garden platform shortly where teachers will be able to import all materials and resources for pupils to use, but pupils will not have access to the public internet.

While a walled garden answers concerns about pupils' safety, some users argue that it is only on the open internet that the engaging effects of audience and access can be felt – especially when contrasted with students' relative freedom online out of school. However, at least one RBC plans to replace the concept of a school-level walled garden with a much bolder and more extensive concept that aims to connect up all users (teachers, pupils and other stakeholders, including parents) in large-scale, protected learning communities while maintaining duty of care:

“At the moment we've got a collaborative program going on between a group of primary schools in London and a group of primary schools in Paris. I'll give you an example: we've set up community areas available for the 20 schools involved. Each school has a separate user area, which can only be accessed by that school and their partner school in Paris and nobody else can. That means that young children can email each other, can go into the community chat room, can blog, can upload, can podcast – because we have a podcast station [on the RBC], can upload pictures... and know that the only people who the system's going to let in to look at that are going to be the children and the teacher in their partner school.” (RBC content manager, South)

Perhaps such approaches are moving beyond the walled garden that effectively encloses a school to a broader concept, that of something nearer a 'walled nation', in which much larger communities of authenticated users are able to generate and share content.

5.1.2 Disseminating practice

As reported in Section 4 and explored further in Appendix 2, dissemination of practice was a noted challenge for innovating schools. With that finding established, it becomes clear that considered visions of how to most effectively disseminate

practice within and between schools are needed if Web 2.0 tools are to be adopted on a wider scale. Dissemination may help address concerns, deepen understanding and promote real choice about the use of Web 2.0. Broadly speaking, the senior RBC figures saw the main challenge as developing and extending good practice, rather than implementing further fundamental change, because the infrastructure and tools were now in place:

“In answer to your question ‘What are the barriers to successful Web 2.0 implementation?’ – well, Web 2.0’s already been implemented, so it’s already successful. How do we make best use of it for education is our problem.” (RBC technical consultant, South)

Many staff in senior positions recognise that individual uptake will vary. One means of encouraging widespread take-up is to select technologies such as VLEs that are simple to use and easy to access. This is perceived by some to be the best way of engaging staff who are less interested in technology but has the disadvantage of being less attractive to those staff with technical expertise who can find simple technologies limiting and unsophisticated. The solution to this is to support multiple solutions but this has the disadvantage that pupils need to learn how to manage more than one interface (arguably a valuable life skill). In school W8, a factor in the successful implementation of its VLE was perceived to be that its use had not been imposed on staff. If it had, then it is believed it would have failed, as staff would only have felt obliged to tick the boxes to say they had used it and not explored further. This follows a business model which has seen this happen too many times.

Another approach is to engage all stakeholders in choosing solutions (learners as well as staff). In one Web 2.0 school (W4), the development of e-learning is seen to sit alongside the personalisation and assessment for learning agendas; these strategies are being introduced side by side, driven through staff development. Web 2.0 schools have adopted a number of strategies to help drive the development. In the schools examined, one or two members of staff have been given responsibility for staff development and encouraging uptake – in two schools as a dedicated full-time post. In some cases, individual enthusiasts are being encouraged to share their practice within their department or across the whole school. In school W2, for example, a member of staff has been given the responsibility of promoting blogging in the school and is providing the technical support (to set the blogs up) and simple user guidelines:

“If you want to allow new ideas and new technologies to embed, then you’ve got to change... you’ve got to have an organic model of delivery within the establishment. You can’t have a sort of supply side service model that is going to be sufficiently flexible and deliver into the classroom.” (ICT co-ordinator, W2)

However, this approach requires funding through releasing staff from teaching commitments, salary enhancements or dedicated appointments. Insufficient funding is perceived to be constraining development in at least one Web 2.0 school (W6) and this is attributed to lack of support from the local authority.

Staff in two Web 2.0 schools noted that staff needed to be 'infected' with enthusiasm and 'drip-fed' ideas; involving pupils in supporting this, drawing on their experiences in and outside school and between curriculum areas, was also seen to be beneficial. In fact, one teacher described how ideas had been passed from one department to another through pupil requests. In this case, the departments did not work closely together and the cross-fertilisation may not have occurred otherwise. However, one headteacher noted that at some point there would be a need to embed new practices within relevant school policies to ultimately achieve whole-school adoption.

5.1.3 Autonomy of technical implementation

Schools must make choices about how much autonomy to retain as regards implementation of the technical infrastructure needed to implement Web 2.0. Retention of in-house expertise, at its best, may yield tools which are more specific to an individual school's needs and more responsive support. However, it could also lack the capacity to respond to needs and cost more to operate. Use of third party services may be more cost-effective and offer a greater pool of functionalities and capabilities. However, it may also offer less personalised support or services, and be slower to respond to requests from the school (for example, facilitating access to a blocked website or updating the content of a website). Autonomy, then, is not only a matter of ownership of support and implementation services: it is also a matter of how effective that ownership ultimately is.

Externally hosted VLEs place a greater strain on bandwidth as pupils need to upload and download resources. When a whole class tries to do this simultaneously, there can be real problems. (Indeed, when 20 students in one school tried to access the log-in screen to commence the Web 2.0 student survey, many machines experienced a 10-minute delay.) Teachers described this issue as being problematic and frustrating when they require whole-class access to such resources in the classroom. Accessing externally hosted resources generally can be slow. It may also be the case that schools that particularly value autonomy tend to be more conservative in curriculum development, since they may be less well connected to alternative models of good practice in innovating partner schools.

The need to moderate postings on blogs and discussion forums (usually after a post has been submitted but prior to publication) is seen to be a potential barrier, particularly in relation to staff time: "I am not sure how much our staff would be up for taking that responsibility." This is particularly problematic when blogs are available to the general public and do not have a mechanism to prevent spamming by 'bots'. In

another school (W4), the time-consuming moderation of open blog sites had led to staff giving serious consideration to setting them up within the VLE in the future, offering a closed and protected environment. In one normative sample school, staff perceived that moderating would be required to manage student use and ensure that such tools were not simply used as chat rooms or inappropriately. This would require a dedicated member of staff to oversee it. However, in the Web 2.0 school in which this has been established (W6), all staff were adamant that the time-consuming nature of moderation was not an issue, although it should be noted that it is currently operating on a relatively small scale and that the environment in this case is closed, not open.

The role of the network manager is an excellent example of the real choices schools must make. Across schools, the roles played by the network manager varied greatly: in one normative sample school, even developing its nascent VLE and running all technical operations in-house.

Network managers generally have a considerable amount of autonomy/devolved responsibility. They identify a particular responsibility for the security of the school network. They have a considerable degree of power over what can and cannot happen on the network, though in practice they work closely with the ICT co-ordinator, both in terms of day-to-day working and more formal structures. They have a mixture of backgrounds, yielding varying perspectives on young people's use of Web 2.0 technologies. Some are themselves keen users of Web 2.0, but others are not so interested or do not have the time. They, like teachers, are very aware of the compelling nature of social networking technologies for young people, even if not being users themselves.

Network managers also work within a context over which they have less control and influence, being that of the local authority and/or RBC. For some, this is a source of difficulty and constraint, though others report good links and responsiveness, for instance, with requests to unblock certain websites requested by teachers for curriculum purposes. Some managers are able to unblock sites themselves, whereas others put this request towards network providers.

Managers are involved in monitoring traffic and use of the network, and access to the wider internet. Not all schools have externally managed blocking – some have “systems in place which will pick things up as they happen... so we let them get on with it.” Such systems may involve alerts to network staff if content scanning identifies potential problems, for instance, use of expletives. Student use of proxy bypass sites is a particular problem in some schools. One manager reports an instance of an entire class using a proxy bypass which was advertised as ‘get past your school's proxy server’ to access a social networking site during an IT lesson. Some managers dip into the site-access logs as ‘light touch’ monitoring, others

randomly access computers while in use to review what is going on, and some mention that 'responsible use' by students also plays an important part.

Network managers and their technical colleagues take pride in the network, but they want to see it used and will investigate possibilities for teachers. Overall, there is a picture of some schools developing their own networks 'their way', and in such cases network managers and their colleagues play a vital part in this in a number of ways:

- Maintaining the security and technical integrity of the network
- Investigating and installing off-the-shelf software products for use on the network
- Investigation and adaptation of open source software for use on the network
- Investigating and advising on the purchase of hardware
- Investigating the possibilities of building the network and installing hardware – in one case all school workstations were self-built and the network was self-installed.

Network managers also varied in their understanding of pedagogical possibilities – some were well informed about learning and teaching matters, and demonstrated this in their comments, whereas others were more focused on specifically technical matters. Clearly, if Web 2.0 activities increase in scale, local monitoring arrangements will be tested even more fully, and may become problematic to manage.

Key points: Choices

- Adopting Web 2.0 approaches entails a number of choices:
 - Adjudicating between locally or externally managed services
 - Choosing between walled garden, 'walled nation' or open internet approaches
- Staff development that maximises support for innovators and makes use of local dissemination is crucial for Web 2.0 development
- Moderating internet content is important, and needs to be carefully managed.

5.2 Opportunities

5.2.1 Young people as a source of opportunity

Some practitioners indicate that the interests and expertise learners may have gained from their out-of-school engagement with Web 2.0 activities may provide sources for opportunities in using Web 2.0 tools in the classroom. Although some

children opt out from or lack access to Web 2.0 opportunities, many children are expert in the area of new technologies:

“And children will be drivers for success: things will change because pupils will take to this like a duck to water, so we don’t have problems with pupils wanting to use it and wanting to work in that way. It’s a bigger problem with some of the teachers who are not as open to change, or that their lessons are always taught this way and that’s always been the case.” (RBC technical consultant, South)

One Web 2.0-innovating school, for example, works with a small number of its Web 2.0-savvy Key Stage 4 students – who in the past have subverted the school systems by installing instant messaging systems for use in lessons and accessing proxy bypass sites – to trial and evaluate new software. This is an example of harnessing learners’ skills for the benefit of the wider school community.

Many teachers identified the importance of acknowledging the internet interests of their learners – and working to resonate educational practice with these experiences. The attraction of internet use was seen as a force that needed to be met and reckoned with by schools:

“We’ve got to start giving students choice. We’ve got to start competing with what they use every day at home and until we start realising that, we’re going to lose them... They’d learn through it [class blog], but they would also want to go onto it because it’s a site that’s different, it can compete with the sites that they’re always looking at, which for us is very much Key Stage 3 and 4, looking at things like YouTube, MySpace and Facebook.” (Innovator 1)

The familiarity that learners claimed for popular Web 2.0 services did not mean that they were aware of a wide range of those services. Sometimes teachers would be introducing applications (particularly for editing digital artefacts) that had never been experienced by learners and yet which turned out to be very popular. In other words, as was found in the earlier survey of student use (*KS3 and KS4 Learners’ Use of Web 2.0 Technologies In and Out of School*), the internet knowledge status of learners should not be overestimated.

As one teacher noted, although the students had some knowledge of the internet, their knowledge might be limited and local:

“Everybody has got some sort of social networking site. But the Ning social networking site was completely different... I suppose over time they’ve learned how to use Facebook or MySpace... a lot of them

found it too complex... but this was new to them. A lot of things are very new to them.” (Innovator 2)

This does not mean that Web 2.0 tools used in school need to be led by social trends. At least one informant argued for keeping a stronger distinction between the recreational and the educational:

“We’ve got lots of pupils at the moment who are using Bebo. I’ve deliberately taken the view that we’re not going down that route. There are some people who think that schools need to kind of go out and let pupils plug in... get the resources via their space. I’m less convinced by that. I still think there is a space where they need to be away from school and our expectations and various other things, and there is also then a space for effectively an online school where the same rules that would apply in school apply in that online environment.” (Innovator 3)

A dominant theme in teachers making sense of their feeling of success comes from simply registering that students are making use of these opportunities:

“I could go on in an evening and I’d get a ‘who’s online’, you know, I could see who’s online, I could see when people had logged in or something... and there’s five or six kids there... nearly always have a look, would be on there every day. It’s not a big group, but quite a small group of kids who were keen to do something creative and share it.” (Innovator 8)

For some, this engagement was viewed in terms of learners gaining a degree of independence in their study. This was welcomed particularly for its long-term promise for creating lifelong learners:

“So it’s not something we can measure in terms of exam results... I think this is going to have the biggest impact on students becoming lifelong learners, because this excites them, this engages them, this makes them interested in a particular topic or a particular idea.” (Innovator 1)

“...it’s then allowing them to do more in their own time, you know, sort of voluntary, without me saying... It’s motivation. It’s independent learning. There are various school issues that this addresses, like independent learning... they’re sort of doing this off their own bat.” (Innovator 13)

Independent learning and lifelong learning are at the top of the skills agenda, and these innovators were clear that Web 2.0 held the promise of supporting these skills in a highly motivating and engaging way.

5.2.2 Curriculum and assessment: Barriers preventing innovation or keys to good practice?

Web 2.0 has the potential to allow deepening of the curriculum and responsive, tailored assessment, yet curriculum and assessment are currently challenges for some schools rather than impetuses for change. Several staff across the sample referred to the need to cover the curriculum and the lack of time/space to introduce new elements or approaches. One teacher noted that from September 2008 – when the Key Stage 3 curriculum becomes more flexible than it has been to date – there would be more opportunities for learners to think and explore. This, she felt, would then have an impact on personalisation – there would be more choices about things to do, and more opportunities for in-depth learning. For one school, the change in the science syllabus to link topics more closely to everyday knowledge (rather than presented as theory out of context) is perceived to suit VLEs and Web 2.0 tools more readily.

One of the primary reasons potential Web 2.0-innovating schools were excluded from participation in the current project was because Web 2.0 activity was found in only a single department, rather than being more widespread. By contrast, in school W6, discussion forums had been adopted by curriculum departments, such as English, media studies, law and MFL, in which communication and discussion are key skills. In ICT and other ‘technical subjects’ such as Mathematics, there had been little interest and limited uptake (despite ICT departments at other schools being hubs for Web 2.0 activity). The history department had expressed a strong interest and were waiting for resourcing issues to be addressed before trialling it.

Even within the Web 2.0-innovating sample, the prevalence of activity varied across departments – and departments were not consistently represented across the sample. In one Web 2.0 school, the main developments to date have been in the MFL department where communication tools obviously lend themselves to speaking and listening activities. In another Web 2.0 school, the forums were perceived to lend themselves to the discussion of art, a key skill that requires development in this subject. At another school, by contrast, podcasts are often created to help with revision activities for exam preparation

Local authority and RBC managers were asked whether in their view there were curriculum areas that were particularly receptive to the possibilities of Web 2.0:

“[English and drama] Yes, the top one... it’s interesting, this is used for descriptive work, talk, descriptive writing, speaking and listening sort of

areas where Web 2.0 comes quite nicely into. But really I think what we've got to try and do is move people on, because it does more than that... but maybe, you know, that's a better avenue into what people can quite easily grasp and understand. Things that I know have been happening very successfully have been, well, for example, a number of primary schools, one of which was in our local authority, worked on an online collaborative project in writing a play, writing a drama. And then when the whole thing was finished, obviously, being constructed, performances were undertaken in each of the schools in the project, which I think is a really exciting way of using, you know, appropriate use of technology to do something that would not have been possible without the use of technology. Imagine doing that by an exchange of letters at second-class mail. It wouldn't have worked." (Local authority e-learning adviser, Midlands)

"[Geography] ...we've been working with creative partnerships in a project this year and it's been to enhance youngsters' understanding of people from around the world so that they don't automatically drop into stereotypical talk. And so we've been linking schools up [from this local authority] to people in other continents... we've had schools in Peru, the South Pacific Islands, Europe and so on. And of course, from our point of view, as a very white-heavy population linking up to some schools just down the road, [in another more urban local authority] where there's a much wider ethnic mix, that's been useful as well." (Local authority e-learning adviser, Midlands)

These innovations included a number of Web 2.0 features: online communities of learning; creativity; schools linking to create and critique multimedia products; and learners crossing cultural and language boundaries. Local authority and RBC leaders suggested that innovations worked well if they were set up in response to an authentic curriculum need (in the case study below, for example, the fact that not all those teaching GCSE PE had sufficient expertise in physiology). The RBC had helped to set up a regional group connecting teachers and schools, and the teachers used the internet to share, critique and develop curriculum resources within an online community of teachers:

"...that was booster classes for PE... we were looking up the mechanics of PE, so this was looking at how muscles operated, how the different joints operated... We were video conferencing and using technology, you know, out in the field, watching people play football and things like that. What we were using was the collaborative technologies... [Researcher: Was there a curriculum need there, perhaps people wanting to do GCSE PE but they might have a teacher

who didn't have a physiology specialism?] Yes, that's exactly why it was done. That was the one teacher who had done it before, he was actually at a school [a hundred miles from some other schools in the RBC]... he wanted to support another teacher to deliver that part of the curriculum." (RBC e-learning manager, North)

However, although this example was one of a curriculum-driven initiative, the secondary school timetable was also named as a barrier to development:

"I'm thinking of most projects we've tried in secondary school... the PE stuff we were doing, Trying to get half a day to get two classes to link together is an absolute nightmare, never mind trying to do it between three or four schools. I think we really need a push from local government or local authorities to maybe do a standard timetable or something like that..." (RBC e-learning manager, North)

This teacher was clearly keen on synchronous communication, but of course most Web 2.0 activity is asynchronous. As in this case, how ICT is taught will have implications for use. In one Web 2.0 school (W6), at the time of this study ICT was not taught discretely at Key Stage 3. Despite attempts to cover all required skills through an integrated approach, this had not been successful due to a lack of ICT skills among some staff. Some staff perceived that the learners did not have the right technical skills to engage with the VLE fully. To some extent, appropriate guidance was offered at the time. However, it did put some staff off introducing discussion forums for learners at Key Stage 3; instead they focused on groups from Key Stage 4. A related issue was identified as lack of continuity with groups. A member of staff commented that you could spend some time training up a group to find that they were taken by another teacher in the following academic year who did not make full use of technology, thereby losing their skills through lack of use.

The nature of the curriculum (or the teacher's interpretation of that curriculum) may shape the use of Web 2.0 tools. One ICT teacher used discussion forums but judged that 'due to the nature of the curriculum' pupils were to be asked to respond to a question that was simply right or wrong. The benefit for the teacher was that all pupil responses were in one location. In other cases, by contrast, the sharing of ideas (how to solve a particular problem) and opportunities for pupils to comment on each other's solutions was seen as valuable.

Assessment for learning was not widely mentioned explicitly, perhaps reflecting the emphasis given to it as an initiative within some schools. One particular headteacher sees an important relation between interactive uses of technology and assessment for learning involving collaborative diagnosis of ways to improve work. An assistant headteacher in the same school develops the theme:

“With e-learning, you have to be interested in independent learners, and you have to have a real agenda in terms of the personalised approach to learning... What we’ve got at the moment – and it’s a very important part of our development – is assessment for learning and thinking skills, that’s coming in with the whole e-learning agenda that we’ve got here at the school.” (Assistant headteacher, W2)

In terms of formal assessment, a headteacher comments that:

“It’s too early... If you went for primary data like exam results, it’s difficult to say whether it’s the technology that’s impacted on it. But if you go talking to some of the pupils who’ve used it with departments – sometimes without realising that they’re using Web 2.0 technologies – and ask whether they think it’s a good idea, so just anecdotal evidence, I think you’d find that a lot of them do see that it’s a positive way forward and it’s motivated several people.” (Headteacher, W1)

Another headteacher concurs:

“We’re still finding more and more uses for [the technology]. We’ve no evidence about the full impact on learning... But as teachers, as a profession, it’s still relatively early...” (Headteacher, W7)

There is little mention made of the formal assessment of work from Web 2.0 sources or where computer-supported collaboration has been involved, perhaps because Web 2.0 has not been in use for long enough for this to have become an issue, or sufficiently widely for issues to have emerged. A number of teachers noted that the requirements to provide evidence in ‘paper format’ for inspection purposes acted as a deterrent to the use of technology in general.

However, the possibilities of using Web 2.0 opportunities to support peer assessment and aspects of assessment for learning are mentioned by a number of teachers. A normative sample headteacher comments that he would like to move away from assessing individuals, and allow more collaborative assessment. Teachers in other schools mention practices which are consistent with assessment for learning, including the opportunity for students to read one another’s work in a VLE, or to listen to it on a voki site, to make comments, and to reflect on and improve their own work.

In one Web 2.0 school (W4), the headteacher sees a strong relationship between assessment for learning and technology tools, particularly in relation to collaborative feedback on how to make improvements. The technology extends opportunities for doing so – learners no longer have to sit next to each other; they can access pupils’

work and comment on how to improve it from anywhere where they can access a computer, at any time.

Key points: Opportunities

- Young people themselves can be a source of expertise in Web 2.0 activity (though teachers should not assume that a high proportion of learners have skills such as media editing and publishing).
- Web 2.0 approaches can be valuable tools in supporting skills for independent and lifelong learning.
- All curriculum areas can participate in Web 2.0 activity (see the case studies below for examples of innovating practice).
- In some schools, the curriculum, and its assessment components, were seen as barriers to innovation; in others, these were seen as areas for opportunity.
- It was generally felt that it was too early to detect impact on learning from Web 2.0 approaches, except in the areas of motivation and engagement.

5.3 Visions

5.3.1 Nature of learning and relationship to technology

For local authority and RBC managers, technology, and Web 2.0 particularly, may be used to support views about the nature of learning which suggest that access to personalised, anytime-anywhere, independent learning are key. This adviser represents the views of all those local authority/RBC managers interviewed, in that he saw obvious connections between Web 2.0 and the government's personalised learning agenda:

“If we think back two or three years, then I suppose in the context of the government's e-strategy, a lot of the things that were being talked about in there, like a personalised online learning space, the kind of aspiration that presented was something that could be very much supported by Web 2.0 technologies... And the sort of things that I think would be particularly supported would be the ability to create user-created content, so to actually interact with the web in a way that was not possible before. Previously, everything was there to be read, but you couldn't actually do anything other than read it... you couldn't edit it. The ability that Web 2.0 gives you to be able to interact with that content and to actually develop it, to change it, to create your own content, really starts to make the concept of a personalised online learning space something which has potentially got much greater value for a learner.” (Local authority e-learning adviser, Midlands)

RBC leaders were clear – Web 2.0 is going to deliver important gains in relation to the access and personalised learning agendas:

“We’re implementing and harnessing technology here. Any time-anywhere personalised learning.” (RBC content manager, South)

“First, it’s going to reach everyone – pupils, teachers, parents and other stakeholders (in hospital trusts, outdoor centres, workplace training centres). Second, new browser-based software is going to revolutionise access, providing anytime-anywhere learning, linked to file storage on a remote server that can be accessed from home, school or any other internet location. I mean, anybody looking now at moving away from their hard disk-based software... a lot of it’s going to be browser-based. We’ve just bought a four-term licence [for browser-based word-processing software], which is an online multimedia word processor for primary children. And we bought that, installed it on our servers and students can run it off the [local] servers using their [RBC] username and password at home or in school or anywhere they want. And because they log in with their username and password, then their work is saved on the [RBC] server, so can be accessed anywhere they want. As soon as they load the word processor, it requests their username and password. That identifies where their work is stored and they can be on a big, fast PC in school or they can be on a mini computer at home working off the wireless and gain access to the same software and the same work.” (RBC content manager, South)

Related to this was an awareness that students needed to be prepared for what was going to be new experiences of the workplace and its technologies:

“Part of the motivation of, I mean, weblogging, to blog in such a small, small system takes away from the whole point of it to a certain extent, I personally believe.” (Innovator 2)

“They may not use Microsoft Word in an office... lots of places aren’t doing it any more now, especially now like Google Docs, where you can work collaboratively with somebody. That’s the skill to be learning... collaborative work and how to have the guts to change what somebody else has done, not worry about where you make some text bold and underlined and how you make bullet points.” (Innovator 7)

RBC leaders were asked who they felt were the key Web 2.0 stakeholders, and what vision they had in relation to how they were to be involved. Some of the answers were ambitious and suggested some significant changes in participation in education:

“[This RBC] will have a single sign-on which will allow... young children, older children, teachers, parents and all the relationships that you could possibly have within that... Pupils’ work stays with them, so when they move school, the work stays with them, doesn’t get stuck within the school... There are some e-safety measures built into it, so the ability to monitor what’s going on... people realise that their workspace is not private, it is open... We’ve also done work as a grid to get a uniform acceptable user policy accepted on every site by those people who have responsibility, the teachers and the governors. And so they pass that down to the schools, it’s very much a school issue. And also to give schools choice and individuals choice, so if they want to do it this way, do it that way. If they want to do it another way, then do it another way. [The service will link to] three-quarters of a million students, about 250,000 members of staff and potentially half a million parents. The school decides [who gets authenticated, and who controls read/write permissions]... because it’s a service for them, it’s not our service.” (RBC technical consultant, South)

5.3.2 The changing role of teachers

A concern expressed by many teachers who were hesitant about the use of Web 2.0 was that it could change their role as teachers in a negative way. However, among individual innovators, one theme that did not emerge, as might have been expected, was the idea that the communication, production and co-ordination tools that are provided by Web 2.0 might serve to make schooling redundant. If anything, informants saw their own supportive role as all the more important:

That’s something we need to be teaching our kids. How do you cope in a world where information overload happens every day? How do you pick the important bits? How do you decide whose blogs you’re going to read? Which news you’re going to follow? ...It would be terrible if in five years’ time the web had reduced itself to the level of the lowest common denominator. (Innovator 3)

“It seems to be accepted that talking about pupils these days... they don’t need us... but it’s nonsense in a sense that actually with the internet a lot of them are not aware of how to use it... the tools... how to use them safely, and that’s just given us a chance to engage with them... you know, if you’re going to have a Bebo page, here’s how to maybe make sure that you’re not leaving yourself open at all.” (Innovator 5)

This view is echoed by some managers. One important aspect of the philosophy that drives local authority and RBC provision in this area is that it will change not only teaching and learning, but teachers:

“...and students are not the only ones who will gain from this. I guess there’s also the potential for teachers to be able to interact with that in that way and for teachers to be able to create resources and develop resources online in ways that could only be done with specialist tools before Web 2.0 technologies came along. And so the whole idea about being able to create content that could easily be shared, either locally or not so locally, gives a whole new opportunity to be used to support teaching and learning.” (Local authority e-learning adviser, Midlands)

Of course, Web 2.0, particularly in out-of-school use, opens opportunities for teachers to interact with their pupils in a more informal fashion. This is not, however, welcomed by all teachers and students: an ICT co-ordinator commented:

“My children said: ‘You’re not going to have a Facebook account, Dad.’ Obviously I could have, but they felt it wasn’t something they were comfortable with.” (ICT co-ordinator, W2)

The same ICT co-ordinator comments that many young staff have Facebook pages, reflecting a former phase of their lives, perhaps as university students: “...there are all sorts of issues, over the next few years, going to come out of the woodwork about this...” A headteacher (W2) notes that: “When a 23-year-old comes in and starts as a teacher, they can’t have a Facebook thing on the web that makes them look stupid.”

The online relationship between teachers and students may be a matter of individual choice. A few teachers at one Web 2.0 school are active in playing multi-user online games, sometimes also involving students. However, attitudes to this vary markedly:

“Our head [of department] will play an online, shooting game against students, and the kids love it... the kids love the fact that they can go home and shoot [him]. In terms of his relationship teaching them, it’s brilliant to have those connections – it’s really quite exciting.” (Teacher, high user, W2)

“You’re in that kind of world, and you have battles against dragons and God knows what in that kind of virtual environment... This member of staff got upset that some children had in some way or other ganged up on him – in this game, nothing to do with school at all. The point I’m making is that a member of staff had exposed himself to a serious potential problem... I said ‘Just go away and deal with it yourself, you

shouldn't be putting yourself in this situation, no more than you'd go round and visit them in their den." (ICT co-ordinator, W2)

Such attitude differences are also evident regarding the use of MSN or other chat technologies to communicate with students, particularly when students are out of school.

5.3.3 A vision of engagement

Interview data indicated that while local authority/RBC managers often conceptualised Web 2.0 as a tool associated with changing visions of education and learning, practitioners often ground the conversation in terms of the increasing motivation and engagement experienced by students using these tools to support learning:

"There is a need for a shift of understanding about the nature of teaching and learning... It's not about applications; it's about a change of mindset." (RBC chief executive)

Throughout the conversations with these national leaders, there was a strong sense of vision and excitement at how internet provision and activity are changing the face and nature of education:

"Well, I think it's, first of all, immensely exciting and immensely important, and I believe it's going to revolutionise the motivation and challenge and personalisation of learning... otherwise, I wouldn't be doing this job." (Local authority e-learning adviser, Midlands)

It is recognised that the community of innovators around Web 2.0 is often engaged in discussion of pedagogy and educational principles. The consideration of such abstractions did not dominate these conversations. Rather than elaborate theoretical perspectives, the enthusiasm for Web 2.0 services was more likely to be expressed in pragmatic terms. One is the simple truth that these activities can often be greatly enjoyed by students and so one perspective often aired is that learning works best when it is a source of pleasure or when the subject matter material becomes easier to engage with:

"...so I approach it from the perspective that I like to make my subject accessible and also popular, if you like." (Innovator 12)

Finally, there were some comments that did touch on the really big picture and thereby contemplated more dramatic issues of educational design. For some, Web 2.0 represented a potential lever to deliver on a range of commitments that have been building up around recent agendas for educational change:

“For the first time, I mean, I’ve been teaching now for about 10 years and for the first time it seems to me that all the agendas that the government are throwing at us... they all come together, because the extended schools hours, that works with actually getting personalised learning.” (Innovator 19)

Some innovators, however, were careful to decouple the technology from the underlying pedagogy and saw Web 2.0 as a mediating technology that was important because it introduced innovative teaching practices:

“For me, it’s not about computers. Occasionally, I’ll still be seen as a kind of a geeky teacher, but I can’t emphasise it enough with my colleagues, that for me, I’ve very little interest in computers, it’s about communication.” (Innovator 5)

Key points: Visions

- For some, Web 2.0 approaches are seen as key to implementing the Government’s e-strategy, particularly in the area of personalised learning.
- The opportunities for anytime-anywhere Web 2.0-led learning, allied with internet-delivered software, were felt by some to offer a revolutionary approach to education.
- To take advantage of these opportunities, both teachers and learners will need to become much more aware than they currently are of the resources that are available to them.
- New Web 2.0 approaches will not make the teacher’s role redundant – it will make the role of the teacher as guide and facilitator of learning even more crucial.
- Teachers as well as students will gain from using these new approaches, though teachers may have to get used to adopting a more informal role.

6 Implications for policy-makers

The policy implications presented here are a result of a detailed analysis by the research team drawing upon a rich range of data sources that together provide a comprehensive picture of the issues relevant to using Web 2.0 to shape teaching and learning. Fifteen nationally representative schools and 12 Web 2.0-innovating schools were studied in-depth during research visits to the schools, resulting in more than 2,600 surveys with learners, more than 150 interviews with teachers, technicians and managers, and 206 surveys with teachers at these schools. A cross-section of nearly 200 parents of children at Key Stages 3 and 4 were surveyed, and in-depth interviews were conducted with nine local authority/RBC managers and 18 innovators in the field of Web 2.0. In identifying these recommendations, the project team took careful account not only of the data gathered, but also the relevant areas for attention highlighted in Becta's Strategic Objectives statement, its Operational Plans, and the Government's Harnessing Technology programme (Harnessing Technology: Next Generation Learning 2008-14). Other reports that have guided the thinking have been those of Leitch (on skills), Byron (on e-safety) and Gilbert (on personalisation). The following are policy implications suggested by this report:

Using Web 2.0 to support learning and teaching

Policy-makers need to be aware that:

- Although the term 'Web 2.0' is seen as obscure or off-putting by some parents and teachers, behind the term is a fairly radical conception of education that emphasises how Web 2.0 can be used to support learning and teaching by engaging students in more participatory learning.
- Behind Web 2.0 is a vision that involves using the internet in more creative, social and participatory ways than was previously the case. Web 2.0 can exploit the internet's educational potential for social learning and teaching, as well as informal learning, and bring in an increased emphasis on autonomy, interactivity, creativity and collaboration. Using Web 2.0 for learning is more about pursuing particular pedagogies than introducing new tools.

The transformational potential of Web 2.0 for learning, assessment and personalisation

Policy-makers need to be aware that:

- Web 2.0 approaches to learning and teaching can have a transformational impact on learning, assessment and personalisation. The potential is for learners to become engaged in more participatory learning, especially in relation to:

- developing new forms of inquiry
- engaging in more collaborative learning
- acquiring new expressive literacies
- finding authentic audiences for their work.
- These four potentially transformative relationships between Web 2.0 and learning are not equally represented in practitioners' views on how Web 2.0 may support learning: finding authentic audiences, for example, was regularly mentioned, whereas developing new forms of inquiry is less commonly a focus for developing practices.
- In the area of assessment, Web 2.0 has capabilities that offer more peer assessment between students, more formative assessment from teachers, and more varied forms of assessment (for example, using video or mixed media as well as print, and valuing informal learning and collaboratively produced digital outputs).
- Many innovating teachers feel current assessment structures inhibit and de-incentivise the creative use of Web 2.0 technologies. Issues related to assessment, such as authenticity and attribution of work, are challenges which do not always receive due consideration. Policy-makers need to identify where this is not the case, and put pressure on assessment agencies where challenges do exist.
- In the area of personalisation, Web 2.0 offers important possibilities in terms of student autonomy, through the production, sharing and storage of the outputs of educational activity. The boundaries between homework and schoolwork, and between formal and informal learning, are blurred with Web 2.0, because work can be accessed and edited from anywhere, and shared with a range of audiences, and stored with greater permanence than paper.

Technical infrastructure to support Web 2.0

Policy-makers need to be aware that:

- Web 2.0 approaches work best when they are built upon a rich and resilient computer infrastructure with good access for teachers and students when they need it, good bandwidth, hardware sustainability, and rapid network support when things go wrong. This general capability must translate into sufficient personal access for individual learners and appropriate spaces for collaborative activities.
- The implications of new digital assessment and recording capabilities are still being explored, and issues of permanence, ownership, file access, storage of large files and data transfer between schools will need very

careful consideration. Issues of intellectual property rights, in particular, are not being systematically considered.

- Schools may benefit from sharing practice and guidance about how to best support their vision of learning and teaching with technology.

Supporting critical literacy

Policy-makers need to be aware that:

- Web 2.0 raises significant issues in relation to the authority and construction of knowledge. While concerns about plagiarism were represented in the data, considered discussion of fostering critical internet literacy – the ability to judge a site's worth and authenticity – was only encountered rarely. The increasing autonomy of the learning and the accessibility of a wealth of information suggest the need for a greater role for schools in supporting learners to be critical consumers and producers of online artefacts.

Considerations of e-safety

Policy-makers need to be aware that:

- Schools have a great responsibility to exercise a duty of care that extends beyond the school walls, both in terms of child safety but also in terms of critical internet literacy. School students need to be taught, and taught in school, how to use the internet safely and responsibly, both for acquiring information and posting their own content. Students need to be taught how to operate safely and ethically in areas that are much less protected than is usually the case in school ICT environments.
- There are significant differences in levels of staffing and resourcing regarding e-safety policy and associated staff development across local authorities. This suggests a need for more systematic monitoring and delivery of e-safety within and between regions.

Staff development and teachers' roles

Policy-makers need to be aware that:

- While Web 2.0 approaches offer students the opportunity to become producers of knowledge, this simultaneously reduces the authority of the teacher in relation to learning. This is inescapable, but it will make some teachers feel vulnerable and threatened, as the traditional authority of the teacher and textbook is undermined by the much more complex and unstable authority structure of the internet.

- The teacher's authority role as the manager of learning is not threatened, but there will be issues for managers as teachers come to terms with the challenge of deciding how to relate to their students in new online environments. Managers did not see technology as replacing teachers – but leaders may need to ensure that there is space within curriculum and assessment structures to meaningfully employ the Web 2.0 toolbox.
- There exists an unresolved debate over whether fostering Web 2.0 necessitates more directive leadership (top-down) and/or the cultivation of a supportive environment for practices to emerge and develop (bottom-up). This does not necessarily mean that all headteachers need to be trained in the uses of Web 2.0 technologies and practices, but that they should be sensitised to the opportunities for learning presented by Web 2.0 and have some idea about how to foster innovative practice and construct effective policies to create a safe environment in which these may take place. Web 2.0 approaches work best when they are underpinned by clear vision and supportive leadership from management, linked to effective staff development for all teachers and additional support for individual innovators. Effective staff development includes enabling teachers to choose how they may use Web 2.0 to support their teaching, and further strengthening their skills in managing online activities.

Supporting successful practice

Policy-makers need to be aware that only a handful of the schools visited claimed to have embedded Web 2.0 approaches across the curriculum. From interviews and surveys, as well as focus groups and surveys with students at these schools, it was clear that Web 2.0 pedagogies flourished where the following were in place:

- A reliable, resilient computer infrastructure with good access for teachers and students, sufficient bandwidth, hardware sustainability, and rapid, effective technical support.
- Clear vision and supportive leadership from management, in conjunction with targeted, effective staff development for all teachers (that covers both technical and pedagogical skills associated with Web 2.0) and additional support for individual innovators.
- Flexible models of learning, with Web 2.0 approaches embedded in the curriculum, both within and across subjects, coupled with support for student learning at home as well as at school.
- Supportive leadership from managers who are sensitised to the opportunities of using Web 2.0 and who can enact an e-safety policy that provides protection while educating learners about responsible behaviour and critical literacy on the open internet.

These individual conditions were not rare in schools, but it was rare to find them all, with curriculum practices that embedded Web 2.0 approaches, both in and out of school. Teachers and managers agreed that there were significant challenges in reconciling security issues, sustaining and progressing innovation, and integrating Web 2.0 technologies and practices with the educational philosophy of a school.

Policy-makers need to be aware that:

- The challenges are daunting – but that as the internet becomes a more stable presence in every classroom, and anytime-anywhere learning becomes a reality for a high proportion of students, Web 2.0 approaches will increasingly permeate the curriculum. Students show a readiness to use Web 2.0 in their extensive social use of commercial Web 2.0 tools, while demonstrating a lack of knowledge about how to use such tools to support their learning. This highlights the contrast between the in-school world of Web 2.0 and the currently richer Web 2.0 world out of school. Meanwhile, many practitioners felt that there existed real barriers for change as they attempted to balance the demands of assessment structures, the need to maintain a duty of care, legal considerations, and the need to locate resources for staff development.

The challenge for policy-makers is to find a series of curriculum spaces where the upward pressure from student knowledge and expectations can meet the downward pressure of system-wide change. It is in this space that schools can begin to meet and accommodate the multiple agendas of new curricula, enhanced skills, personalised learning and harnessing technology.

Appendix 1: Methodology

Recruitment of schools and individual innovators

In order to obtain a nationally representative picture, but also to ensure that the project encountered many examples of good practice, the research involved two populations of schools: a normative group; and a group of Web 2.0-innovating schools. The final set of schools spanned 18 local authorities from Devon to Teesside. Twelve of the 15 normative sample schools were a subset of the 27 schools identified by the national ImpaCT2 project (Becta 2002), an investigation into the relationship between ICT and school attainment. Where schools declined to participate, others matching their demographic and ICT capability were approached. Despite best efforts to recruit across the range, the schools that agreed to participate were slightly higher on average in socio-economic status than would have been ideal. Three additional schools were therefore recruited as substitutes, matched on geographical and demographic variables to three that had declined.

In the case of the 12 Web 2.0-innovating schools, inclusion necessitated evidence of active and sustained involvement with Web 2.0 approaches in at least two curriculum areas. Project members evaluated the practice in over 70 schools and 14 schools were issued formal invitations to participate – yielding the 12 innovating schools whose practice is shown in this report. Recruitment activity included internet searching, reading the grey literature, and seeking recommendations of Becta, academic colleagues, industry, NCSL, and Web 2.0 innovators, among others. Recruitment of schools to make up the Web 2.0 sample proved challenging, for three reasons. First, using recommendations (electronic or word of mouth) for preliminary contact turned out to lead to a number of false trails. Second, in many instances a school was associated with a single Web 2.0 project with little or no discernable evidence of Web 2.0 activity being established in more than a single curriculum area. Third, some schools that might have been recruited were already committed to working with other projects (including some funded by Becta), and were therefore unable to participate in this project.

Multimedia interviews were conducted with 18 teachers across the country who had made significant progress as Web 2.0 innovators within Key Stage 3 and Key Stage 4 contexts. Most of them are currently working teachers in this sector, although three have adopted advisory or consultant roles and are significant leaders in the informal network of Web 2.0 innovators. These innovators were recruited through internet searching, grey literature, and recommendations from industry, Becta, the media, colleagues, and innovators as previously.

The project sought the views of national leaders of ICT in education on the relationship between their own organisation's ICT policy and that of relevant schools, local authorities and related RBCs. As part of this effort, extended telephone

interviews with 10 RBC and local authority ICT managers were conducted. These individuals were recruited through recommendations from Becta and colleagues.

Data collection

The project team carried out audio-recorded interviews with approximately 150 teachers, managers and technical staff at the project's 27 schools, as well as surveys with 206 teachers from the participating schools. Surveys were also conducted with 76 parents from participating schools and 45 parents from the service, management and administrative listings of one of the research centres. In addition, approximately 100 focus groups were held and 2,611 surveys completed by students at participating schools (the details of student data is found in other project reports).

Individual innovators were interviewed using a multimedia set-up enabling remote desktop viewing to allow the researcher to view the innovators' Web 2.0 practices under the interviewee's direction. These interviews were audio-recorded and the researcher's screen was video-recorded to capture the artefacts of the innovators' Web 2.0 activity.

Appendix 2: Case studies

Context and rationale for use

In this section, data is presented based on staff interviews from eight Web 2.0 schools identified as innovating in at least two curriculum areas. In addition, a case study of a school from the normative sample is presented as an example of an emerging Web 2.0 school. Finally, a fictitious case study is presented that is intended to represent a school where Web 2.0 activities are not currently part of the school vision, drawing from issues in a number of schools. Case studies from eight of the 12 Web 2.0 schools are presented, in order to illustrate how a critical mass of activity can be established in different school settings. In all eight Web 2.0 schools examined, the development has been organic and bottom-up rather than imposed upon staff through policy changes and whole-school implementation. It should be noted that one of these schools (W12) is still largely at a planning stage, having tried to implement changes but not yet successfully overcoming the barriers. Nevertheless, those plans are interesting and worthy of reporting. A table at the end of the appendix provides contextual information about all but the fictional case study, together with an outline of the interviews upon which each study is based.

In three Web 2.0 schools (W2, W7, W11), the use of tools were driven by staff in the ICT department (with other individuals) either through interest, an identified way of improving teaching and learning, or the need to keep up with technological developments. In some cases, Web 2.0 tools were used to meet the requirements of the ICT curriculum. In two Web 2.0 schools (W4, W6), the VLE and other technology tools were introduced initially as a means of reaching learners beyond the school walls, bringing in-school and out-of-school learning together. In two Web 2.0 schools (W6, W8), the use of the VLE has developed in response to exploring the possibilities of the functionality provided. Teachers have seen potential uses and developed them in relation to their own practice, prior to cascading their experiences to other staff.

As can be seen from the table below, judgements have been made from the available evidence about the prevalence of use of a range of Web 2.0 tools. Some teachers clearly are making substantial use of Web 2.0 tools, but the experiences of single cohorts (a class of pupils) is often quite limited, perhaps once a year or once a term to support a specific activity such as exam preparation. Therefore, what teachers feel constitutes regular use is open to interpretation.

Table 1: Range of approaches and prevalence in the Web 2.0 school sample

School	VLE	Forum	Blogs	Wikis	Pod-casting	Social networking	Social bookmarking	Other/ remote link-up	Instant messaging
W1					X				
W2	XX	X	X		X	X			X (staff-pupil)
W3			X	X				X	
W4		XX	XX	X	X			X	
W5 ¹	X	X				X			
W6	XX	XX							
W7	XX		XX			X			X (staff-pupil, pupil-pupil) ²
W8	XX X	XX	X		X			X	
W9	X	X	X			X			
W10	X	X				X		X	X
W11	X	X	XX	X	X	X	X	X	X (staff-pupil)
W12		X	X			X			

X – experimental, one-offs or one-way, or one or two teachers only

XX – more regular use (at least half-termly, often weekly) although by less than 20% of staff

XXX – regular use (at least half-termly, often weekly) by a substantial number of teachers (between 21% and 50% of staff)

XXXX – embedded within school across whole curriculum (used daily, virtually all staff)

¹ Only survey data was collected at this school because it emerged that uses of Web 2.0 tools were very experimental and had only involved a small number of students.

² This table represents prevalence in relation to educational activities. It should be noted that pupil-pupil use of instant messaging, often for social purposes but also for educational purposes, was described as regular by staff.

As Table 1 shows, in the Web 2.0 school sample, there were at least two examples of Web 2.0 activity in every school apart from W1, but regular use, and use that was embedded into the curriculum, was very rare. In the normative sample schools, by contrast, there was evidence of some experimental use of Web 2.0 tools and/or collaborative activities. In many cases, tools such as blogs are explored, but only experimentally, as part of delivering the ICT curriculum. Many staff reported using YouTube clips to support teaching and learning, integrating them into presentations or accessing them directly across all curriculum areas. Some teachers reported that there were formal and informal uses of Web 2.0 tools. For example, in one school, Year 11 pupils used a social networking site for coursework support. Some staff are experimenting with podcasting and see the potential for supporting students who have missed classes. There were examples of one-off uses of Web 2.0 tools, such as using a blog to support communication with parents when on a school residential trip.

It should be reiterated that the final case study is a composite of five normative sample schools at which Web 2.0 was not a current focus. It does not represent a single school and is as such a fictitious account. The departmental examples in the final case study are based on particular observed instances of attitudes which were not conducive of Web 2.0 activities. It is not suggested that these are typical of such departments in schools generally.

School W2: Use of public blogs, peer assessment and coursework management

While generally e-mature, Web 2.0 use at school W2 is in early stages of development driven by four or five enthusiasts, mostly in the ICT department (blogging, peer assessment), with some in geography (blogging, coursework management). Blogging is used to support single activities or (in geography) to disseminate information. All GCSE geography coursework is managed through the VLE. Pupils have their own pages on the VLE and reportedly use it for file storage. Instant messaging is enabled between staff and pupils only.

Examples of use

The Key Stage 4 ICT course blog had a small number of posts but only from staff. A Year 8 blog was created for a single citizenship activity where learners posted a piece about themselves as refugees, which had numerous initial posts but no comments. A geography blog is relatively well populated offering a repository for multimedia resources that could help learners (at GCSE level); evidence of two-way communication (comments and postings by learners) is extremely limited. There are some extra-curricular uses of Web 2.0 tools. For example, one blog poses thought-provoking questions for anyone (within the school or not) to respond to. It was initiated in November 2006 with an initial vision of posting a thought for debate on a weekly basis; 22 have been posted altogether, each attracting somewhere between 5 and 28 comments, mainly from staff and pupils. There are one or two discussion forums set up for pupils to use if they choose to do so. One in relation to game design was described to be 'lively', run by pupils and used to share ideas about games. One teacher is running discussions on philosophy.

A history teacher has taken responsibility for the appearance of the VLE and is trying to make it appear similar to social networking sites. In a Year 10 ICT unit, pupils upload a piece of work and rate each other's; an average rating is calculated to facilitate ranking. A 'message wall' has been created where pupils are encouraged to leave comments about how the VLE could be improved, largely focused currently on appearance. To develop peer assessment, the teacher has created a 'knock-knock' joke competition. The rationale is to create an informal activity that pupils will choose to engage with but that has peer assessment underpinning it to explore potential issues. Pupils rate each other's jokes and there is a leader board for those rated most highly. The approach will be rolled out into curriculum areas and embedded in formal learning activities when the development and testing of this approach is complete. The 'profile' is being developed so that links to pupils' uploaded work are automatically created, enabling others to rate and comment. In addition, pupils will be able to control who has access to this by selecting 'friends'. Finally, pupils will be able to self-monitor and report inappropriate behaviour.

Geography coursework at GCSE is now managed through the VLE. Instant messaging has been enabled between pupils and teachers (not between pupils and their peers). Some pupils use this feature to ask questions about the coursework. Pupils submit their work which is marked using 'track changes' and returned. When resubmitted, the teacher only needs to check the text that has changed. It is perceived to have cut teacher workload substantially and improved the quality of coursework. The teacher does not need to carry workbooks home; marking can be staggered if wished. Pupils receive feedback more promptly and staff perceive that they feel the process is more personal. There is a need to set a limit on the number of times that pupils can resubmit their work and to establish clear procedures. Some pupils, for example, may expect instant feedback. Peer assessment could be introduced as part of the activity but the staff are severely constrained by lack of access to computer rooms which offer whole-class individual access. The GCSE coursework is undertaken at the end of the summer term when access to computer suites is easier.

In the previous year (2006-07), an MFL teacher created blogs and podcasts for German. Pupils created podcasts with vokis of themselves speaking with each other but had not commented on each other's work. The teacher left in September 2007; links to the site had been maintained but the resource had not yet been taken on by any other staff in the MFL department as 'you need a little bit of technical nous to run with this stuff'. These podcasts are still accessible within the VLE and logs show that pupils still access them from home. Podcasts were created in geography to support GCSE revision but were not perceived to have been used widely, although used by students who would not have revised otherwise. Apart from this, occasional school podcasts have been created, reportedly no more than one or two across the school per term.

Management of widespread adoption

Autonomy is encouraged for interested staff – a 'distributed leadership model'. The model is organic and teacher-driven (demand-led). Top-down initiatives such as online reporting are managed through a 'drip-feed approach'. There are incentives for 'champions' (salary enhancements); each department has one to lead development on the VLE. Investment in infrastructure and resources is prioritised. Funding from external initiatives has pump-primed some development. Hosting websites in-house means that individuals in departments have more control and can upload content directly – engendering greater ownership.

Challenges

Lack of individual pupil access to technology in school is constraining development. Instant messaging has not yet been enabled between pupils because there is no facility for granular control, and so no means of enforcing sanctions for inappropriate

behaviour. Staff concerns over inappropriate postings (which are public) acts as a deterrent; they need to be reassured that it happens rarely and can be dealt with through moderation. It can be time-consuming moderating blogs (issues with monitoring for spammed comments on some public blogs). Staff perceive that tasks using Web 2.0 need to be carefully structured and teacher-driven. Some external sites require pupils to register using individual email addresses and this can be a time-consuming process (taking one or two lessons). Staff turnover and the local authority's concerns over safety ('over-interpreting the law') can be an issue. Centrally managed systems (external to school) can become a bottleneck and delay progress; addressed by moving systems in-house but need more technical expertise. Demands of covering the curriculum constrain opportunities. There is a need for some technical expertise (or at least confidence) to set up external sites (currently required for blogs as the facility in the school's VLE does not have a comment option).

Factors for success

Strong leadership and management combined with autonomy for enthusiastic innovators. The staff who are innovators are willing and able to support staff with less experience of technology – there is a philosophy of sharing. There is an emphasis on staff-led professional development rather than external courses. Good technical support. Use of external forums for additional ideas and support is perceived to be beneficial. A focus on education rather than control in relation to internet access (although some restrictions are applied and technicians describe it as moving towards a walled garden); it is seen as a behaviour problem managed through sanctions and granular control over access. The school hosts systems (servers, website, additional filters) in-house which means a greater degree of control and autonomy.

School W4: Exemplary use of wikis and vokis

At school W4, most of the development to date has been in MFL and Welsh where Web 2.0 tools are being used, for example, to record and share conversations, engage in self-assessment and peer assessment, and then make improvements using vokis embedded in wikis. They are used to support specific activities (revision, preparation for oral examinations, to support a unit of work) depending on the year group. The accumulating material is forming a useful repository of activities to practise language and vocabulary. In addition, the staff of the mathematics department are perceived to be active users of blogs and forums. More experimental uses include podcasting and two wikis to support specific projects. A podcasting site has six contributions from December 2006 to June 2007 including an interview with the minister for education. The school website and newsletters have been produced regularly on a blog, but this is being moved to the VLE. A major challenge to date has been negotiating local authority policies on internet access; staff are frustrated that they are not trusted to judge whether a site is appropriate or not. An 'inspirational' deputy headteacher has driven most of the development in the school; he has since left but the replacement had 'Web 2.0' in the job specification.

Examples of use

In Welsh, Web 2.0 developments started in 2007 with the use of a wiki to act as a repository for resources and function as a discussion tool. As wikis are not designed primarily for either of these purposes, it is not surprising that the teacher concerned found that the site was becoming 'quite clogged' and moved it to the VLE. Learners in Welsh have a discussion within the VLE in relation to each piece of work, together with peer assessment. Wikis are used for knowledge/research-sharing in Welsh, such as one specific example recently on national heroes. The department has recently obtained a number of voice recorders and has used vokis within lessons. Staff are now investigating a group voice messaging system with photographs of participants which are foregrounded when an individual speaks; communication can be live and synchronous, or recorded and asynchronous.

Two MFL teachers set up wikis in January 2007 for French, German, English and Welsh. The sites have been used intermittently to support specific activities (assignments, preparation for oral exams, a link with a partner school in France, revision of unit). All pupils were invited to contribute, although this required them to provide the teacher with their email address. There is limited evidence of contributions by pupils (generally no more than three or four vokis or other uploads for each activity), although some contributions were a means of pupils communicating with their teacher to obtain help with work in holiday periods and were subsequently deleted. One teacher said that the contributions were done in the pupils' own time, which could account for the small number (rather than whole-class involvement). Different applications are embedded within the wiki to support different

purposes. Vokis are used to present audio files which can be commented on or downloaded to mobile phones. Comments can be recordings or text entries, which are then converted into speech (highlighting incorrect spellings of French words, for example). Each voki has attracted differing numbers of comments (in one case, according to the teacher, 45), more commonly text-to-speech entries. The audio files include staff, staff interacting with pupils, and pupils on their own. In one or two cases, pupils are invited to take part in peer assessments and judge the level achieved by the speaker. One or two PowerPoint files supporting revision for a specific unit and created by a pupil have been uploaded. An interactive quiz generator has been embedded in some pages to create game-format revision activities (largely concerning vocabulary) and also as a 'random name-picker'. One of the two teachers has mainly developed her site to disseminate information such as general guidance, useful web links and course outlines. The other teacher suggested that a lot of the resources are used in lesson time to support whole-class activities (peer assessment, for example).

This use of technology in both Welsh and MFL is perceived to have motivated boys and to have raised achievement for those individuals who have chosen to use the facility (higher-ability, motivated students). It engages pupils beyond the school walls; many pupils' contributions to the MFL wiki, for example, are made out of school hours. For the teacher, it is reported to make teaching more fun, and to make assessment easier than marking exercise books.

Management of widespread adoption

A proactive, enthusiastic deputy headteacher (who has since left the school), described as 'inspirational', initiated much of the development. The headteacher has a positive attitude to technology and a clear vision of its use to support teaching and learning. The replacement post for the deputy headteacher had 'Web 2.0' in the job description and a similar enthusiast was recruited (although with a different vision of management of change). There is positive promotion of ICT training and support; all staff are encouraged to do ECDL. Staff are released from teaching to undertake training provided by external organisations as required; this is seen as a sound investment. Supporting staff and department autonomy is perceived to be beneficial, particularly focusing on one or two departments initially and drip-feeding new ideas. Staff are encouraged to avoid using technology for the sake of it and to ensure that its use will directly support learning and teaching.

Challenges

The wiki site was blocked initially but access was negotiated with staff at local authority level. (This acts as a deterrent to using other websites, for example, a Welsh social networking site.) The school does not provide personal email addresses for e-safety reasons. Use of the wiki requires pupils to register with their

personal email address. This clearly inhibits use (which is largely voluntary). There are issues relating to the open nature of externally hosted blogs and wikis. Initially, pupils made 'silly' contributions to the wiki and tracing authorship is difficult, but the teacher is alerted whenever a contribution is made and simply deletes inappropriate ones. She addresses this issue through positive reinforcement, awarding merits, for example, for valuable contributions and effort. Currently, it is a time-consuming activity for the teacher who uploads contributions and ensures that pupils are made aware of new material. There are currently limited opportunities to disseminate experiences to colleagues in other departments; it is difficult to overcome staff resistance to change and innovation. In addition, some staff are not willing to undertake what they perceive as a risk. It is felt that plagiarism is an issue that needs to be addressed.

Factors for success

The personalisation facilitated by the voki, for example, is perceived to have engaged and motivated pupils. Pupils can select and tailor the avatar presented. The voki is safer than some tools (those which enable users to customise photographs of themselves) as they cannot be used to identify individuals. The infrastructure is good: all classrooms have interactive whiteboards and laptops. Pupils are informed about rules of use and general classroom management strategies also help to ensure use is appropriate. There is a positive approach to ICT and innovation, and a willingness to take some level of risk. SLICT training for managers and leaders is perceived to be very beneficial. Strategic direction is informed by a 'futures planning group' (staff) and a group of pupils (intended to support product selection).

School W6: An example of rolling out discussion forums across a school

School W6 was identified for its use of discussion forums in a VLE in English and MFL (and initially in A-level law). There are currently six out of 18 English teachers using the facility and two out of six MFL teachers. However, it is clear that the frequency of use varies by teacher (half-termly, weekly, termly). School W6 provides an opportunity to see how a large institution is attempting to drive an initiative throughout the school, albeit still in the early stages. The choice of VLE, perceived as simple to use, is seen to be a key success factor (although some staff feel it lacks flexibility). As use increased, the school realised that a dedicated technician/administrator was required to support staff on a day-to-day basis; until this appointment was made, development was halted.

Examples of use

In English and media studies, the discussion forums are used in many ways: gathering research and sharing knowledge; discussions; reviews and polls; and to provide a bank of resources, ideas and exemplars. For example, reactions to particular scenes in key texts are shared among learners, beginning with an initial prompt from the teacher, seen to be a factor for success as no learner wishes to be first to make a contribution. In a research task, learners might be given a starting prompt relating to something contextual (for example, Elizabethan theatres) and then would spend some time gathering research and sharing what they found with their peers. In a knowledge-sharing activity, individuals or groups share their work (in this particular VLE entire essays can be posted within a discussion) and elicit feedback from their peers. Similarly, teachers have asked learners to post their essay question responses within a discussion forum, creating a repository of examples to which the teacher can direct students to provide examples. These repositories can be carried over from year to year so that later cohorts have access to an even more extensive range of resources and examples. The forums are largely used for homework tasks due to the constraints of the curriculum and because face-to-face activities were seen as more appropriate in the classroom. However, the discussions are seen as a valuable means of extending these classroom discussions, while supporting anytime-anywhere learning. It is perceived to produce a level playing field, engaging pupils who would not normally volunteer to participate in discussions, particularly in relation to voicing opinions. Being able to direct pupils to good ideas, opinions and exemplars from peers is perceived to be very beneficial; with long-term use, the bank of resources increases. Peer learning is perceived to be powerful.

Teachers are expected to moderate the discussions themselves. The discussions have been set such that new postings are displayed immediately 'because it needs to be instant in order for it to be powerful'. In practice, there have been very few issues. As a walled garden (each discussion is generally closed to learners beyond the class), students are not at risk of damaging the reputation of the school or

revealing personal information to a huge audience. In addition, the students are aware that misconduct will result in loss of privileges.

The VLE itself was also used for resources and communication. This was seen as particularly valuable, by staff, students and parents, for students who were on study leave or not at school for other reasons (sickness, phobia, etc). In these cases, students could continue to seek advice on model answers to exam questions, for example, through instant messaging, which was seen to be 'labour-saving'. An additional benefit was perceived to be the usage statistics generated by the VLE, indicating who had contributed and how many times, which enables teachers to see quickly who is not participating.

Management of widespread adoption

Driven by an enthusiastic member of teaching staff and a member of support staff (who have other commitments and hence little time). To date, the 'champion' has invested a substantial amount of her own time, which is not a sustainable model. A philosophy of sharing and regular dissemination has helped.

Challenges

The lack of technical and administrative support was presented as a major barrier to progress and was due to the limited capacity of the lead teacher. Lack of staff time to develop uses. Some staff do not like the current VLE because they perceive it to be 'clunky' and unsophisticated; they use alternatives with pupils having to adapt to more than one system. Substantial investment in a VLE could be an issue if the local authority decides to switch to another provider at a later date and it proves difficult to transfer resources. Some technical issues: logging on reported to be slow by one teacher; assigning class lists to discussions is currently time-consuming. Pupils' social ICT skills do not always translate into effective uses for learning; they need to be provided with appropriate skills to use the VLE effectively. They also need to be educated in new ways of communicating through discussion forums. Staff were concerned about overload through being inundated with instant messages; this is deterring take-up. Inappropriate uses by pupils are reportedly rare but have deterred one member of staff from developing extensive use of the tools. It is perceived that inappropriate use could be more widespread as the initiative scales up.

Factors for success

The selection of a VLE that is simple, functional and easily accessible is considered to be key (although staff perceptions may differ). While inappropriate behaviour is reportedly rare, teachers recommend monitoring forums at least weekly. The success of the discussion activities was attributed to a degree of trust between staff and students, and also by treating each class as a separate and closed group, making moderation more manageable. In relation to scaling up the use of discussion

forums, the co-ordinator of this initiative perceived that there could be more instances of inappropriate postings as student numbers involved increased. One teacher noted that discussions were most effective when there had been some prior preparation in relation to the task in the classroom. One of the impacts of this approach was that all pupils contributed: in one forum a teacher said that there were 600 postings by a class of 30 pupils. Salary enhancements for 'champion' staff offer a good incentive. An organic approach is perceived to be successful; if an idea/tool is good, it will spread without the need for policy drivers.

School W7: Bespoke Web 2.0 whole-school implementation, including instant messaging

School W7 provides a really interesting example of a school that has created its own bespoke environment with e-portfolios, blogs, student profiles and instant messaging (being the only example from the case studies to enable student-to-student messaging during school hours). This is in addition to a VLE which is used as a repository for curriculum content. All students at Key Stage 3 have their own tablet PC provided by the school and therefore access is ubiquitous. The current challenges include a new build planned for two years hence, which means that it is not worth investing substantially in the current infrastructure, and a lack of interoperability between school systems (a solution is being researched but has not yet been identified). Currently, four departments (humanities, science, MFL, arts) are using it and some individual teachers across the school but there will be drive to encourage more widespread uptake in the next academic year.

Examples of use

School W7 has developed an alternative to the content-heavy VLE that students can already access, harnessing Web 2.0 tools to engage learners. It has been created by teachers within the school and is now available for other schools to purchase. It offers a closed environment with blogs (for teachers and students), the facility to upload files either for assessment or to publish, and an e-portfolio to support specific project work. In addition, students can edit their profile, sharing personal interests and uploading photographs. Finally, it facilitates instant messaging – the only means of engaging in this activity within school. While not used formally to support teaching and learning, there is evidence that students are using the instant messaging to converse about school activities, seeking support and help from each other when they have difficulties understanding tasks that they have been set (for example, in mathematics). Students can create friendship groups online allowing them to control who has access to personal spaces and who can communicate with whom. Everything can be monitored by the teacher. Sanctions are given for inappropriate use, placing the onus of responsibility with the student. The instant messaging is currently largely used for social communication, which sometimes requires controlling through classroom management. However, this is viewed as a positive incentive to engage students with the environment (which is being populated with learning resources) rather than being perceived as a major classroom distraction. Thus, the benefits for teaching and learning are seen to outweigh the challenges. It has only been available since December 2007, but is already believed to be popular with students because they have the freedom to use it in the way that they want to. Teachers perceive that it is popular with students because it is easy to use, and there is a degree of student ownership and control, although everything can be monitored by teachers.

The students who participated in focus groups had mixed views on the facility. The instant messaging facility was not used outside school as public messaging systems were perceived to be better (one pupil said you cannot see who is online when in school). The purpose of this communication tool was questioned by some when in face-to-face settings.

A specific project involves 15 Year 11 students who have been given a popular hand-held device and can access the e-portfolio to practise study skills. They were given resources on how to revise and make notes, then they make revision notes, and every couple of days they meet with a teacher and are given an assignment which they complete by writing a blog post about some aspect of their studies. These students were targeted because their predictors suggest better performance than current achievement. The hand-helds are motivational. Students have responded well and the content they are producing in the blogs is perceived to be very good and shows progression. The project is monitored so that if a student does not use the hand-held sensibly and does not participate fully, then it is taken away and given to someone else.

Management of widespread adoption

Enthusiastic staff driving the innovation are constantly thinking about better ways of doing things and finding technological solutions. Dissemination and sharing is important. There are five days of CPD to support staff using the VLE, which take the form of lots of sessions run by different people and which staff can elect to attend; they were reported to be always well attended.

Challenges

Currently home use of tablet PCs is not monitored and there are concerns about inappropriate use. However, the school is about to invest in software which will monitor home use in the same way that school use is monitored. Off-the-shelf VLEs were perceived to be too inflexible. Legal/copyright issues proved to be a barrier to the continuation of a school-run internet radio station. The licensing requirements proved to be too demanding, particularly on the teacher's time, and so the initiative ended. Currently, there are a number of separate systems (learning, online reporting, email) which do not communicate with each other. The network manager is investigating alternatives but some of the solutions identified are (inevitably) more complex to use, which is an issue that needs to be resolved. The teacher who developed the e-portfolio noted that he was constrained in his own use by cultural expectations in his department – an expectation to use a scheme of work and set of resources that already exist. Requirements of exam boards and curriculum and assessment requirements are also perceived to constrain opportunities. Staff movement (between courses and year groups) affects continuity of tailored activities.

Factors for success

Local control of filtering (provided through the local authority) and email systems (exchange server in-house) minimises delays and enhances autonomy. A relationship between staff and pupils that is grounded in trust and accepting responsibility. Abuse of this results in privileges being withheld. Providing tablet PCs and offering features such as instant messaging engages students because it provides something they value. A very enthusiastic team of three teaching staff (one with technical expertise, the others with ideas) have developed a system from scratch and been willing to invest substantial amounts of their own time. Adopting a walled garden approach ensures that maintaining security and managing student contributions is easier. This offers a more personal approach while ensuring that privacy of staff and pupils is protected.

School W8: A VLE in regular use

All pupils and staff have access to the VLE and a few individuals outside the school have also been given access. Teachers' uptake of the VLE is more than a handful, but not as widespread as the e-learning manager would like. Essentially, the focus so far has been on exploring its full potential – for example, science open discussion forums both within year groups and between year groups, resources such as quizzes, and teachers providing questions for homework. The science and mathematics departments have led the developments to date. There has been some blogging using an open source blogging tool, chosen because it was understood to be highly customisable. In the art department, pictures have been uploaded and pupils have been asked to comment on them. MFL have created a small number of podcasts of teachers modelling speech. The VLE is used to support discussion and online interaction for the four students who are undertaking AS-level sociology (with limited timetabled lessons). An enthusiastic e-learning manager is driving developments. A steady increase in activity suggests there may be workload issues with regards to managing pupil contributions, which are currently monitored one by one.

Examples of use

In the mathematics department, one teacher started with a discussion of a puzzle targeted at gifted and talented groups in Years 10 and 11. This teacher had also found it to be successful in terms of one-to-one mentoring for revision purposes. He felt that it was easier within the VLE than by email, partly because the forums were located in the same area so all supporting resources could be accessed from one place. However, unsurprisingly it was more successful with keener students and some required a substantial amount of chasing. Pupils are encouraged to upload 'maths-related' photographs and record and upload relevant songs which centre on associated learning. The maths department had also created some podcasts for revision.

In science, for example, a discussion was created to support a topic on death and decay, primarily to investigate micro-organisms and what they needed to grow. The focus was mummification as the teacher felt this would be more interesting for learners, which proved to be the case. Students found examples (such as pictures of shrunken heads) and posted these to the discussion, as well as animations. In addition, a teaching assistant (a physics graduate who was about to start teacher training) also participated in the discussions, which was perceived by the teacher to extend opportunities further. The discussions were supported by other resources, such as presentations and quizzes (which could be attempted as many times as students wished). One teacher said that students were also creating quizzes themselves and uploading them. As well as teacher-led discussions, there was also an open science forum in which learners (over 1,600 in this school) could discuss

any aspect of science and post links to websites and resources. This forum had two rules: 'Talk science' and 'Keep postings appropriate for all'. It was open for all year groups leading to some evidence of peer tutoring occurring. Teachers in science also used the communication tools in the VLE to mentor students on aspects such as project work, providing feedback at times that were convenient to staff and immediately available to students. The resources for science were perceived to be mostly used to support revision. A forum was created to support a link with a school in Belgium with eight sixth-formers at each school; the focus was on climate change but conversations moved off-topic and became more social. This was perceived as a failure but it could have been due to the lack of critical mass or subject area, or that the task was optional and not related to formal studies.

Pupils are competitive (boys especially) and have been noted, in their own time, to repeat quizzes more than the several times that they have been made available online by the teacher. This is attributed to the immediate feedback from the marking, enabling pupils to try repeatedly until answers are correct. The quizzes are intended to support learning not assessment. The open nature allows students to explore topics of interest to them not on syllabus, thus supporting personalisation and self-regulated learning. It also allows technicians and others to include their expertise (and also be seen as something other than just technicians). This was another useful/vital decision: to include the lab technicians in the VLE activities so they are also taking part in the online discussions, adding their own expertise and materials, and generally widening the breadth of participation rather than limiting it to teacher-pupil interaction. The VLE was also felt to have encouraged a different blend of interaction than in classrooms, allowing quieter pupils to have a voice rather than interactions being dominated by louder, confident members of a typical class. The VLE enables teachers and students to interact at times (and locations) that are convenient to them and also means that feedback is better as teachers are not so pressed to give instant feedback as in a class environment.

Management of widespread adoption

Much of the work with the VLE is being driven by the e-learning manager who is extremely enthusiastic in promoting its use. This is a two-way process of being proactive and reactive: proactive in showing what can be done and suggesting to teachers and departments as well as being very supportive of teachers, who of their own accord, approach and ask whether something can be done and how to do it.

Challenges

Concerns are over pupils' abuse of the VLE and posting inappropriate content; acting as a deterrent to some staff. This happens rarely and not maliciously. The risk is perceived to be small as the time between posting and removing is likely to be

brief. As use of the VLE and discussion forums increases, there could be a workload issue (staff are alerted via email when a student posts a contribution).

Some teachers perceived that they had little time to use the VLE and hence lacked confidence. Getting all staff involved (it is not yet compulsory) is seen to be a challenge. There were some concerns about plagiarism and students using incorrect English. In addition, some staff noted that pupils need to develop search skills and view content more critically rather than accepting everything that is written as fact. Pupils also need to learn how to use the VLE. There are some concerns about some pupils not having access to computers at home or having to compete with family members for access. The deputy headteacher reported that parents had expressed concerns about their children using the VLE in relation to cyberbullying and social networking (where comments about others are public); parents feel it is the school's responsibility to deal with broader issues of e-safety. Handheld devices and mobile phones are not supported by the current systems in place (firewalls, filtering and monitoring).

Factors for success

Staff are released from teaching to engage in training and development, such as learning how to use the VLE. They are encouraged to approach the e-learning manager if they have an idea and would like guidance on how to implement it. Staff are given autonomy to try out new approaches and innovations. The school has a dedicated server that can handle the demands of a VLE under the direct control of the school. The school has its own filtering system and software to monitor pupil use, which produces reports of activity when certain keywords are mentioned and also takes a snapshot if certain inappropriate sites are visited. The VLE is open source; other software is cheap or free. The VLE is perceived to be simple and easy to use, offering high returns for low-time investment. Its use is not being enforced across the school. Pupils have access to the VLE to upload material. Introducing innovation to pupils as they enter the school means that its use is part of their culture from the outset.

School W9: An example of social networking development

This case study provides an interesting example of how an e-portfolio system is being presented to pupils as a social networking site both to stimulate engagement with the VLE and to develop their ICT skills. The school has used a VLE with an e-portfolio facility since September 2007, but interactive aspects are still in early stages of development – they are still building its use. There is a developing staff area on the VLE, with a home page for each subject. Parents can see information such as schemes of work online, and should soon get their own log-in. Public social networking sites and instant messaging are blocked at local authority level. There is extensive web-based email use (Years 7 to 11 can use it only within school); people are expected to check daily, and pupils email staff. Departments make different uses: setting and marking work online; putting lessons online; uploading presentations; data-logging; and storing resources. The network manager commented that, whereas initially traffic was mostly downloading, there is now much uploading, and 90% of that is by students. Video conferencing is used for A-level psychology and law, with a remote tutor. Internet safety units are run at the start of Years 7 to 10. Major concerns relate to the issues of changing VLEs and inadequate infrastructure. The key success factor is the enthusiasm and drive of the ICT co-ordinator.

Examples of use

In school W9, the VLE has an e-portfolio facility which has been enabled since September 2007. This has been used to offer students personal spaces on the VLE. Guidance on how to use tools to do this is provided as a ‘unit of work’, accessible within the VLE, and student engagement with this activity is stimulated both by the ICT curriculum requirements and a competition to find the ‘coolest’ space. Every student has the option to create this space and have an introductory lesson at Key Stage 3, while later year groups (Key Stage 4) are required to create blogs and interactive surveys. Unsurprisingly, take-up and engagement is varied but some students have customised their pages both in terms of format/presentation and content (for example, uploading personal photographs, links to Flash games). About 10% of students are very active. The network manager commented that initially traffic focused on downloading but that now there was also a lot of uploading: “...ninety percent of that will be students.” The tools to support collaboration and communication are limited; instant messaging is not enabled as a school policy. However, students can comment on each other’s pages and contribute to blogs. Students from Year 10 appreciated the opportunity to express their opinions, and seek those of others, and share information. Students from Year 8 were less enthusiastic, did not understand the purpose of the space and noted limited time to develop it.

One ICT teacher noted that students may be more wary of contributing when aware that their activities are monitored as compared with the unrestricted nature of public sites.

From a different perspective, another ICT teacher suggested it would be useful in terms of supporting e-safety and educating students if public social networking sites were accessible from within school, as then he could say “right, get your [social networking] site up, let’s see how you’re developing it”, enabling informal monitoring to take place rather than, as currently the case, being unaware of students’ private practices.

Management of widespread adoption

An organic approach; 10 staff were trained initially in the VLE. The ICT co-ordinator, appointed to lead developments and on the leadership pay scale, is willing to support interested staff but waits for them to come forward when they are ready to be innovative – he sells the ideas as and when he can.

Challenges

There would be a huge interoperability problem if it were necessary to change the VLE and transfer materials; this makes staff cautious about choosing the wrong VLE. Staff would like integration of the VLE with the management information system (for example, school register). Poor infrastructure and particularly wireless coverage is currently a barrier. There can be problems with a whole class trying to log on to wireless at the same time. Bandwidth can create problems. Staff do not have time to practise or use new ICT skills. For ICT leaders, there can be difficulty getting material from colleagues to post on site; some subjects do not see it as useful. YouTube is useful, but banned. The Ofsted model of a three-part lesson is seen as inhibiting pupils from taking responsibility for their own lessons. Competition within league tables discourages collaboration between schools. There are staff concerns with the ‘digital divide’ among pupils. Developing a culture of sharing and collaboration is an issue.

Factors for success

The strategic importance of the ICT co-ordinator in carrying things forward. An administrative assistant is available to manage the site. Over 80% of students have access from home and 60% have broadband. The senior management team and governors support the principle of a computer for every child. Year 7 pupils arrive with good IT skills, learned in primary school or at home.

School W11: A small school experimenting with a wide range of Web 2.0 tools

School W11 has an e-learning co-ordinator (also the head of ICT) who has time allocated to develop the use of ICT in the school (50%). He has been in post since the autumn of 2006. There have been many experiments and one-off projects, largely within ICT but also in history, maths, music, PE and English. These have involved a wide range of tools including blogs, wikis, podcasting, social bookmarking and web conferencing. This has revealed that pupil registration to use numerous sites can be time-consuming. Additionally, the e-learning co-ordinator is concerned about pupils sharing their personal details. This has been resolved by creating pseudo-email addresses (but this may not be feasible in a larger school). Key success factors are the enthusiasm and technical expertise of the e-learning co-ordinator, and the '50% timetable' releasing him to support interested staff.

Examples of use

The music department has had a blog since 2006 and uploads podcasts of performances, inviting comments from members of the school community. The blog is being run at the moment by a Year 11 pupil. The English department has recently started an extra-curricular project for book reviews in a blog. All readers are invited to submit book reviews and comment on each other's work. There were 82 posts from students during the readathon week but no evidence of commenting despite prompting from the teacher. This activity was seen as the 'starting point' for the English department. Another blog initiated by the mathematics department had a short piece about a Year 7 trip to RAF Cosford in February 2008. It had received 51 comments (including some during a holiday period) from Year 7 pupils who were invited to comment on their personal experiences. The PE department has just started to use the blogs to report again on sporting fixtures, following an initial experiment in the autumn of 2006.

A science teacher is using a web-conferencing system to collaborate with feeder primary schools. He sits in his science lab with a webcam, and videos are uploaded into a user library. There are six pupils in each of two feeder primary schools who also have a webcam so everyone can see each other. The teacher is piloting delivery of lessons remotely. It is possible for pupils from different schools to interact with each other and therefore for collaborative activities to take place. This is perceived to be particularly beneficial in rural areas where opportunities for meeting pupils from other schools are limited. There are delays in terms of uploading and downloading resources; the teacher has to make sure that this is not time wasted by talking during these periods. The feedback from staff at the primary schools has been very positive. It has provided access to specialist expertise. Broadcasts can be recorded, saved and accessed later, for example, by pupils who were not able to attend the lesson or for consolidation. At the time of our visit, there had been two pilot sessions. There are issues (download times and managing communication

effectively) relating to scaling up to include all nine feeder primary schools. The ICT skills of staff at one of the primary schools were perceived to be greatly improved; relationships between the feeder primary schools and the secondary school have been strengthened.

A Year 8 class did a collaborative project on the history of the village where the school is located using a social bookmarking site. They evaluated each other's sites after compiling lists of links to useful web pages. They used a pseudo-email to register as the school has concerns about using personal email in such circumstances. The social bookmarking site does allow users to start building their page before registration is complete which minimised the delays. Wikis and forums have also been used in history to share ideas and research: "They were quite open, sharing their ideas, more so than they would be if they were sat opposite each other." The teacher also felt that quieter pupils made more contribution in the online environments.

The VLE is being used by staff in some curriculum areas. Instant messaging between staff and pupils has been enabled and some pupils use this for contacting staff with questions about homework. This is perceived to be beneficial because it is similar to pupils' social ICT practices but also more flexible as pupils can ask a question when they think of it and sometimes get a quick response. The blog facility in the VLE does not support comments so is currently being used with pupils in the lower school as a learning journal in ICT lessons. After each lesson, pupils are encouraged to reflect on what they have learnt and identify what they need to learn next. The teacher felt that this was a powerful way of finding out what needs to be covered in more detail as well as saving time: "Marking that is a lot easier than sitting down with a pile of books." In the previous school year, wikis and forums had been used in geography. Year 7 classes were asked to co-construct classroom rules for IT lessons using a wiki. This proved to be effective with the final rules perceived to be better than those the teacher could have come up with. School news is presented via the discussion forums in the VLE. However, many of them currently have no responses, suggesting its current use is largely one-way dissemination. Pupils are encouraged to suggest which tools might support their learning. Examples include Bublr (for creating comic strips using Flickr photos) and Voicethread (for uploading images and facilitating comments from invitees – via voice, annotation, text, uploads, telephone). Voicethread was perceived to enable quiet students to present their ideas without having to stand in front of an audience which can be off-putting. Gifted and talented pupils in a lunchtime club use a 3D immersive environment similar to Second Life but, it is perceived, with more of an educational focus.

Management of widespread adoption

The e-learning co-ordinator spends time working with enthusiastic individuals; those who were interviewed greatly appreciated his support. Staff come up with issues that

they would like to address or activities they would like to do and the e-learning co-ordinator is able to suggest a range of technical possibilities. There has been a focus on using tools with Year 7s as they enter the school: "It becomes seen as ubiquitous in school and Year 7s, more than any other year group, use it a lot at home because they are familiar with it and they have been introduced to it at a younger age."

Challenges

In this school, there has been concern about the Web 2.0 tools that require registration and for users to provide information such as email addresses. This has been resolved by providing all pupils with pseudo-email addresses that are directed to a teacher. As this is a small school, there may be workload issues should this approach be scaled up. The registration process is considered to be time-consuming and this has acted as a deterrent to staff. However, the e-learning co-ordinator suggested that with experience (both staff and pupils) the process is much faster. Individual blogs for students have not yet been enabled because of management issues such as e-safety. Staff noted that there was a lack of time to develop familiarity with the VLE and create resources to populate department areas: "Getting the teachers involved is the hardest thing... not that they don't see the value of it but they are snowed under what with being dedicated teachers." It is difficult to create opportunities for all staff in one department to meet together to share and cascade experiences due to timetabling. Instant messaging between pupils has not been enabled; the e-learning co-ordinator tried it once but was concerned about the amount of time pupils spent messaging each other for social reasons. Access within school is considered to be a barrier; it needs to be ubiquitous. Bandwidth is now a real issue, especially when multimedia resources (video clips, podcasting, 3D environments) are being accessed. Access to internet sites was perceived to be restrictive although the reason for filtering was recognised. Currently, teachers access video clips from home, download them onto a memory stick and bring them into school.

Factors for success

The school has an enthusiastic e-learning co-ordinator with a 50% teaching load. He offers support to any staff who are interested – they suggest the problem and he identifies potential technical solutions. He runs a weekly training session for staff after school. Identifying ways of ensuring that staff see the potential of new tools is seen to be beneficial (supported by back-door introductions to facilities and features). Granular control of internet access is perceived to be beneficial, as is educating students about the potential dangers of the internet and asking them to co-construct the rules of use. Individuals are given autonomy to develop new approaches. A cascade approach is perceived to be beneficial.

School W12: Challenges facing an emerging Web 2.0 school

School W12 was selected for its self-reported use of social networking and blogging. However, we found that Web 2.0 uses were exploratory and that the school had faced barriers which severely constrained development. The school does not yet have a VLE and is considering a walled garden, into which teachers can import all materials and resources for pupils to use, but pupils will not have access or need to look for resources on the general internet. Staff perceive that it will offer an area for showing off students' work, facilitate the sharing of good practice, provide a link to parents and be a useful PR tool. There is a desire to bring as much in-house as possible and to opt for a content management system, enabling the VLE and school website to be integrated. The main barrier has been RBC policies which tightly control internet access. A new appointment of a full-time resource manager (an enthusiastic technician) is a key success factor in relation to the developments achieved to date.

Examples of use

In the initial contact with this school, it was suggested that a social networking tool had been implemented for some ICT and Classics classes, along with blogging and forums using specialist tools. Also, we were told they were using an open source online photo album for A-level photography and an inexpensive online photo gallery tool as a general image library. The school was planning the introduction of a VLE and assessing/trialling a range of options. They reported that they had been investigating hosting their own social networking. All of this development had apparently only taken place since September 2007 when they obtained an open source server which would allow this.

During our visit, the actual prevalence of these activities suggested they had been very much exploratory and not widespread. This was not through lack of interest, but an overall problem with the external filter implemented by the RBC which, for example, actually blocked the social networking site, stopping the class from learning this way and also blocking certain search terms. This major barrier was at the root of the desire to implement a walled garden VLE – this was seen as one of the easiest ways of overcoming the filtering issues experienced to date.

The Ning social networking tool was used initially for some ICT and Classics classes for two sixth-form groups; one group were set homework every week on the site and students were supposed to comment on the theme for the homework:

“Getting them to do that proved to be relatively problematic to start off with. Then for a couple of weeks, it was running okay, then it got blocked [by the RBC] and that was the end of that. Because if you can't access it in school, it's no use to me.” (ICT teacher, W12)

This teacher commented that there is “nothing you can do to tunnel through” the RBC filtering system. He noted that there are means of doing so if you want to access a single web page, but it is not feasible if you try to access a series of linked pages. Interestingly, the RBC concerned has started a consultation on its approach to filtering by initiating a blog inviting stakeholders including students and teachers to comment on this issue. There have been no contributions to date.

Management of widespread adoption

A member of the ICT technical team was responsible for e-learning initiatives; this role accounted for 20% of his time. The importance of this in driving innovation was recognised and his responsibility was extended to full-time.

Challenges

Overcoming RBC policies on what can and cannot be accessed within school; the external filtering is tightly controlled and currently the most significant barrier. This could be underpinning the current thrust to develop a walled garden where no external access is facilitated – a means of getting round the current problems. The school could opt to take responsibility for filtering but has no wish to do so. Access to technology within school is perceived to be a barrier. Some of the current infrastructure is outdated and slow; this should be resolved through a forthcoming new build. Bandwidth has been an issue. This has been partly resolved by installing a dedicated server in-house. Funding (access, staffing) is perceived to be an issue. No communication tools are available for pupils. While potential (through carefully structured activities) is recognised, it is perceived by some to be too much trouble to manage. Pupils need to be educated regarding acceptable uses of Web 2.0 tools. Some staff are concerned about home access (including internet access). Time is perceived to be a barrier for some staff in order to develop expertise and create resources.

Factors for success

This school has created a central post – an enthusiastic person in charge of e-learning providing good liaison between staff and IT support staff. Each teacher now has his/her own laptop which has had an impact on staff confidence. Cross-curricular ICT is now delivered by technical support staff. An organic approach to develop at a speed which staff find comfortable, rather than trying to move too fast and losing people (staff, parents, pupils). Sharing best practice and disseminating experiences is perceived to be helpful. The injection of funding from specialist school status is perceived to have helped to drive forward developments.

School N1: An example of a normative sample school as an emergent Web 2.0 school

The school has no VLE at present, but is investigating possibilities. However, it has appointed an e-learning co-ordinator to look into wikis, podcasts, blogs and other Web 2.0 tools. The e-learning co-ordinator started a password-protected wiki (accessible only to those in school), but the school had problems hosting it and backing up, so it was blocked at the time of our visit. Each pupil has a school email address, the school is moving to the use of email communication among teachers, and there is electronic registration via a wired desktop in each room. Pupils have web-based access to schoolwork from home.

Examples of use

The software used to create the wiki was selected based on local control in relation to moderation, and to be easy to adapt to staff needs. It was used to record photos and impressions of school trips. Each department had a section and each form had a section where pupils could create a profile and share discussions. Some entries had links to internet resources:

“He puts the answers for the homework once it’s been handed in, if you got any wrong, and how they actually work it out on there, so it’s kind of like useful. And it helps you if you’re stuck.” (Year 8)

“We have like a school wiki and like for each form and then we all put pictures and just have a little bit of information. But everybody has to have a log-in name and a password so then you feel a bit more confident in going on, because on Bebo, if somebody knows you, then they can go on your site and... it can get wrecked and you don’t know who’s done it.” (Year 8)

“It’s a way you can actually talk to people but you don’t have to pay for it and you don’t have to like download anything. And it’s safe.” (Year 8)

“Some teachers have got stuff on there that’s really, really useful, and others haven’t got anything that’s helpful at all. And we’ve got our own form page and stuff.” (Year 10)

The school has also developed instant feedback, web-based mathematics activities. All students begin DiDA in Year 8, doing at least the first award. One pupil described using a social network site to get friends to review her drama homework.

Management of widespread adoption

The appointment of an enthusiastic e-learning co-ordinator is starting to move things forward. An ICT policy group with representation from teaching staff also meets regularly.

Challenges

Access to Web 2.0 training and activity is limited and unreliable. YouTube does not work because of technical problems. Staff are concerned about converting students' energy for social networking into enthusiasm for the school curriculum. The blocks on some websites means that staff are not always sure what is available to them. There are concerns that an 'off-the-shelf' VLE will offer too much functionality, requiring staff time to learn – there are issues of locus of ownership and control, by school or by supplier. Priority to protect security and integrity of network is restricting importing web-based activities. There is little perceived 'push' from staff, but a perceived 'push' from Ofsted/government/Becta.

Factors for success

Up to 90% of students have home access to internet on entry. The e-learning co-ordinator has a postgraduate degree in computer science, and is personally enthusiastic about IT possibilities. There is sharing of ICT good practice in staff meetings. The deputy headteacher chairs the ICT policy group – student representatives will be invited onto it in the future. Students caught onto wikis very quickly. The school has an override system enabling internet or email to be turned off in individual rooms, in order to remove distractions, without impeding other rooms.

Composite normative sample school where Web 2.0 is not a current focus

The following case study portrays a composite of five normative sample schools which, when taken together, provide a rich picture of a school where using Web 2.0 for learning is not a current focus. It describes some of the challenges of leadership, pedagogy, staff development, and technical aspects faced by a nationally representative cross-section of schools.

The previous headteacher believed ICT should be cross-curricular, not a separate subject, and did not see it as very important. Although the school performs quite well in other subjects, pupils' grades and SATs in ICT had been noticeably lower. The newly appointed head of ICT sees her job as building up a department which previously did not exist, and is focused on delivering courses such as DiDA, rather than encouraging other departments to take up the use of Web 2.0. Other staff view the school's adoption of a VLE as a personal development target of the individual head of ICT, rather than as something relevant to all teachers. The governing body does not give any strong lead on Web 2.0.

A major restriction on use of ICT is a shortage of computers. Although the new headteacher has invested heavily in providing two new computer suites, these tend to be taken up with courses such as DiDA, so it can be difficult to book a suite in advance for a one-off lesson. Staff have only recently all been issued with a personal laptop. Not all classrooms have interactive whiteboards, although all have a projector; those who have struggled to learn to use an interactive whiteboard to its fullest tend to feel overwhelmed by constant new technology. The catchment area contains considerable areas of economic disadvantage, so many pupils do not have home access to computers or broadband. This discourages staff from setting homework which requires internet access. A recent survey of parents found many who preferred to receive text messages rather than emails.

Staff attitudes to ICT and Web 2.0 vary considerably, both between and within departments.³ The science department is enthusiastic about the internet as a source of information, and as a store for lessons which pupils can access from anywhere, but they see no use for the collaborative skills of online networking which they see as purely social rather than educational. English department staff are unconvinced that their subject is suited to online learning ('a computer can't interpret a poem'); staff in art or PE departments see their subjects as primarily practical, not virtual, though they can see the value of accessing podcasts. Within MFL, one teacher was keen to set up links with schools abroad, but found that schools in other countries lacked the

³ The departmental examples here are based on particular observed instances of attitudes which were not conducive of Web 2.0 activities. It is not suggested that these are typical of such departments in schools generally.

necessary technical infrastructure, and e-safety concerns meant it was not permissible to put pupils in direct contact with each other, so all messages had to be routed via the teacher's account.

Email use is sporadic and some staff are fearful of using computers at all. Others are enthusiastic about ICT, but think very much in terms of Web 1.0 uses. Terms such as wiki, blog, podcast and RSS feeds are words they have heard, but they feel their time is too overloaded to have the energy to 'play around' with new skills in their own time. They are not yet clear about the educational application of these new technologies, and the existing curriculum does not require them to use Web 2.0. Some staff are comfortable to admit that they lack skill and learn from pupils, but they know other teachers feel threatened by a sense that pupils know more than they do. Although staff training is provided, they do not have the opportunity to use the new skills often enough to remember them. They have had too many experiences of technical failure to rely on the internet in lessons. The school has a website, but this is seen more as a public face of the school than for the use of pupils' learning. Examples of pupils' work and photos of school events are available only on the intranet. Many staff use the online facility purely for document storage.

Teachers are aware pupils use the internet a lot, but see this as play and do not consider these skills to be exercised sufficiently responsibly. Pupils use Wikipedia or Google without checking the accuracy of the information, and readily plagiarise by using copy and paste. Staff have concerns about literacy: poor readers may find reading on-screen difficult without a teacher available for support; writing and spelling includes examples of text-speak.

A major restriction on the adoption of Web 2.0 is fears about e-safety. All social networking sites are blocked, as is YouTube. Attempts to set up an internal messaging system, with space for personal profiles, were severely restricted, as pupils engaged in bullying each other – a few made unacceptable comments about teachers, and some girls were found to be posting compromising pictures of themselves. In spite of lessons on e-safety, sharing of passwords and usernames by pupils is endemic. The school has got into a vicious cycle, blocking what are perceived as inappropriate websites while pupils devote their energy to finding ways round these by use of proxy servers. This makes it difficult to rely on trust and common sense for the majority, and just restrict a handful of specific breaches. Pupils and staff complain that even useful sites are now blocked by excessive filtering: music students cannot access music, art students cannot access many images, educational games have to be specifically unblocked. PSHE issues such as health hazards of drugs, contraception, different faith views of the death penalty, child protection advice from the NSPCC, even safety advice about the use of blogs, are likely to be blocked within school, so pupils find it easier to research them from home. A young male teacher, who at his previous school used to join pupil chat

rooms at the weekend to help them with their homework, was hesitant to do the same here, in case his motives were questioned.

Although the headteacher talks enthusiastically about the potential of mobile phone technology, mobile phones are not allowed to be on show in lessons, even to photograph artwork, and a pupil with a personal organiser was banned from using it for its calculator function during exams (on the grounds it has access to the internet, as well as texting facilities).

Some staff are concerned about gender stereotyping: boys mainly playing games, and becoming socially isolated, while girls use networking sites or online shopping.

Technicians at the school spend a large amount of time checking the latest proxy servers being used by pupils to get round restrictions. They do not believe the school has the storage space to cope with the large video and audio files which pupils would like to upload, or with the scale of e-portfolios which they see government policy as tending towards. They fear that expectations at a policy level that all schools will have the latest version of software, as well as a VLE, by a given date, will be beyond their budget. Many machines do not have the specification to run these, other software is not compatible, and they do not have the time to install the new software on every machine in the school, or sufficient training to cope with all the extra demands of Web 2.0. They comment that they tend not to be consulted about major technical decisions, and then have to cope with difficulties which could have been avoided.

A number of parents had concerns about e-safety, and felt that children needed the presence of a teacher to guide and motivate them, or to help when they are stuck. Some parents were concerned that exams are not yet geared up for online skills, so attention to Web 2.0 skills might detract from academic attainment.

Contextual information relating to the case study schools

Case	Size	Ages	Single sex/ Co-ed	Comp/ Select	Urban/ Rural	Attainment on entry	FSM	SEN	No. of inter-views	Informants
W2	Large	11 to 18	Mixed	Comp	Mixed	Well above average	Below average	Below average	7	Headteacher, ICT technician, ICT co-ordinator, four teachers
W4	Small	11 to 16	Mixed	Comp	Semi-rural	Well above average	Below average	Below average	7	Headteacher, network manager, e-learning director, four teachers
W6	Very large	11 to 18	Mixed	Comp	Mixed	Well above average	Below average	Above average	10	Deputy headteacher, network manager, lead teacher, seven teachers
W7	Large	11 to 18	Mixed	Academy	Town	Significantly below average	Well below average	Not available	5	Deputy headteacher, network manager, three teachers
W8	Large	11 to 18	Mixed	Comp	Sub-urban	Marginally above average	Below average	Below average	11	Deputy headteacher, lead teacher, eight teachers, librarian
W9	Average	11 to 18	Mixed	Comp	Rural	Average	Below average	Average	6	Headteacher, ICT co-ordinator, network

										manager, three teachers
W11	Small	11 to 16	Mixed	Comp	Rural	Average	Below average	Below average	5	E-learning co-ordinator, two ICT technicians, three teachers
W12	Large	11 to 18	Mixed	Comp	Mixed	Average	Average	Above average	5	Deputy headteacher, head of department ICT, network manager, resource manager, teacher
N1	Small	11 to 18	Girls	Gram- mar	Town	Well above average	Below average	Below average	4	Deputy headteacher, network manager, e-learning co-ordinator, teacher