National Museums Online Learning Project

Stage two report: part 2

Watching, gaming, learning: webquest contexts of use

One of the schools we visited had mounted an exhibition on 'Web sites that changed the world': nearly all of the paradigm-shifting sites had been blocked for use in schools by restrictions imposed by the local authority

Summary

We use this report as a way of reflecting on some of the key issues which appear currently to impact on online learning in schools. This contextual work forms the background for further research to be undertaken over the autumn of 2008, as we investigate the implementation and use of specific webquests in schools. We interviewed project resource writers, and also groups of children and their teachers in four English schools committed to implementing the webquests in the next school year. From this data we identified three key themes which set the context for this programme of implementation, and for online learning in schools more generally:

Surveillance

Online learning in schools takes place within a context of control, constraint and surveillance. While teachers and children recognise that the internet can be risky, both groups express significant frustration with the overly-regulated, managed and censored internet environment within which schools are obliged to operate. The principles of the panopticon apply throughout school online education, with children's work and interaction watched and monitored by teachers, and teachers' work and interaction monitored and contained by local authorities.

One significant implication of this for the project is the tendency for entire National Museum web sites to be blocked by local authority filtering software. Potentially, this could prevent implementation of the webquests in certain local authority areas, particularly where individual teachers do not perceive themselves as having the ability to affect which domain names are blocked, and where the principles and procedures for blocking and unblocking appear haphazard and without consistency. However, this is an issue which we understand is already being dealt with by the project.

Digital literacy

Where internet environments are overly-regulated and constrained, teachers' opportunities for helping children to develop the digital literacy skills needed to manage and negotiate the riskier, more challenging and potentially more enriching aspects of internet use are limited. We identify from the literature two dominant understandings of digital literacy: one which focuses on the technical and operational skills (keyword searching, information evaluation) needed in order to be able to use the internet; and one which is more concerned with the ability to take a critical approach to the interpretation of digital texts which – in their volatility, linkability and collaborative nature – are radically different from those informed by the culture of print within which our understandings of literacy have emerged.

In line with the original implementation plan for the National Museums Online Learning Project, we see a continuing real need and opportunity for the webquests to continue to push a critical literacy agenda which scaffolds and challenges children in terms of their engagement with digital culture, rather than limiting, constraining and over-structuring it.

Gaming

Finally, we identify among children an expectation of interaction with online resources which is to a large extent structured by the experience of gaming. We look in this report at some of the games children appear genuinely engaged by, and at another which they find 'boring'. Bringing these

insights together with findings from the currently available literature on online educational gaming, we outline a range of game-design strategies which might be adopted in the design of the webquests. Overall, we find that the educational gaming environments which engage and enthuse children are those which are genuinely *digital* in their aesthetic, structure and design and, without suggesting that the webquests be re-designed as games, we outline some of the ways in which this immersion in the digital might be expressed in the design of the webquests.

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Introduction

In our first 'Stage 2' report, we provided portraits of some Creative Journey authors, and explored themes emerging from those snapshots of the partners' users. In this, our second report issuing from Stage 2 of the project, we turn our attention to the webquests. Our aim here has been primarily to look at the *contexts* within which the webquests will be used by schools. Within what kind of educational climate will the webquests need to be implemented? What is currently driving school children and their teachers to use online resources? What constraints are they facing in terms of their ability to operate in online learning contexts? What excites children and teachers about online learning – and what bores them?

For this stage of the research we first interviewed the six resource writers employed by the project. We then interviewed children and teachers from four English schools – two secondary (years 8 and 9) and two primary (year 4). We interviewed six children and their teacher from each school – 28 interviews in total. We were also taken on a tour of each school, during which we gathered visual data on the various environments within which online learning takes place. Three of the schools we visited were rated as 'above average' in their Ofsted inspections, and one was rated as 'below average'. All were located either in Newcastle or in Doncaster.

For the final stage of our research – in October-November 2008 – we will return to these schools and conduct observations of the webquests in action with these same children, alongside further interviews with the teachers and pupils about specific webquests. For this stage, however, we focused not on individual webquests, but on the technical, pedagogical and cultural contexts within which online learning is used, embraced and resisted in these particular schools.

This brief report explores the three key themes which emerged from these interviews, expanding on some of the theoretical and pedagogical issues with which the webquests must intersect as they are implemented across the school sector. These themes function as three quite different 'lenses' through which we can view both the work of the project, and the impact of online learning in schools more generally. Each lens reveals something new not just in terms of the theoretical contexts of the project, but also in terms of how the stage of development currently underway might be managed and approached.

First we consider the issue of **surveillance**, considering how the culture of visibility and control dominates the use of online learning in schools, and the possible implications of this for the project webquests. Then we turn to the theme of **digital literacies**, the nurturing of which was foregrounded as an aim in the original project plan, examining what the term actually means in contemporary online learning contexts, and how the pursuit of the literacies ideal might inform project development over the coming year. Finally, we look at the issue of **gaming**, considering why it is that online learning activities structured like games appear to be so compelling for school children, and what – if anything – the gaming approach to design might offer in terms of webquest development.

Online learning in schools: surveillance, control and constraint

In our first report we identified one area of tension currently affecting teaching and learning in schools: that which exists between a culture of performativity and the drive for innovation in pedagogical method. Emerging from the data generated for this second stage report is a similar theme – a tension between surveillance and autonomy.

As we recognised in the first report, such underlying tensions have their basis in societal and cultural issues which cannot be resolved by the project, yet each has significant implications for the way in which webquests are likely to be received and used in schools and are therefore of immediate and practical relevance to the work of the project.

To frame our discussion of surveillance and constraint in this section, we draw upon some of Foucault's (1977) ideas relating to 'technologies of power', and raise some questions about classroom pedagogy and its broader location within the context of a culture of surveillance in the digital domain.

The panopticon: 18th century prisons and 21st century classrooms

Jeremy Bentham conceived of the panopticon in 1791 as an innovative prison architecture – a 'humane' way of achieving conformity and order. The panopticon is designed in such a way that the cells are placed on the periphery with a watchtower in the centre. The cells are designed to prevent communication between prisoners. Light is used carefully to ensure the watchtower guards can see each person in the cells but they themselves cannot be seen. The aim is to achieve control by isolating the prisoner and forcing them to believe they may be under constant surveillance. In his 1975 text, *Discipline and Punish*, Foucault used the panopticon as an instance of the emergence of a new kind of disciplinary power, one which functions less through the imposition of physical force than through its ability to bring about conformity through self-regulation:

> At the periphery, an annular building; at the centre, a tower . . . the peripheric building is divided into cells . . . All that is needed, then, is to place a supervisor in a central tower and to shut up in each cell a madman, a patient, a condemned man, a worker or a schoolboy. . . . one can observe from the tower, standing out precisely against the light, the small captive shadows in the cells of the periphery . . each actor is alone, perfectly individualized and constantly visible. The panoptic mechanism arranges spatial unities that make it possible to see constantly and to recognize immediately. . . visibility is a trap. (Foucault 1977: 200)
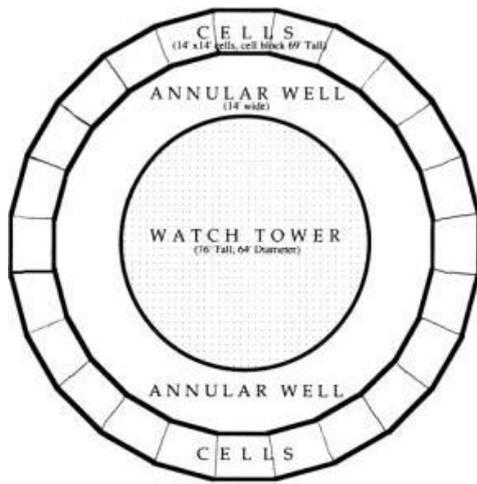
Figure 1. Plan of Bentham's panopticon

The panopticon has been regularly used as a metaphor, particularly in debates about online environments and cyber-surveillance (Land and Bayne, 2005), and offers a powerful trope for considering how power relations are constructed and maintained in institutional contexts. As a 'technology of power' (Foucault, 1977) the panopticon is remarkably effective; it relies not on violence or force but instead creates a culture of self-regulation and normalises surveillance. Obliged to assume he or she is being continually watched, the subject is disciplined into docility by the invisible gaze.

The panopticon metaphor has been particularly helpful for us, as we draw parallels between the data generated during our interviews and surveillance and control within schools. This we have broadly categorised and explored in two ways: surveillance and monitoring on the 'real estate', and the visibility and control of the 'virtual estate'.

'Real estate' surveillance

Cells: screens always facing the 'watchtower' or network points connected to a central point of control (e.g. city hall)

Watchtower: teacher, 'city hall', CCTV, filters and firewalls and surveillance software
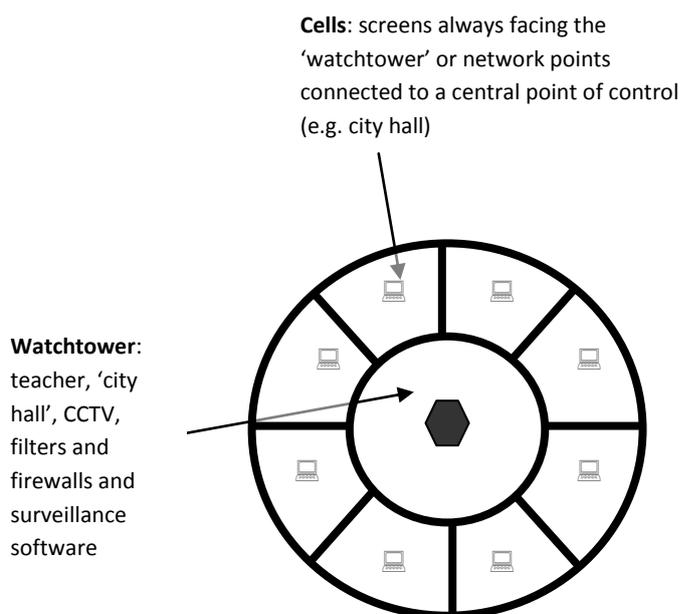

Figure 2. A panoptic view of computer labs in schools,

From our visits and tours of the schools it became evident quite quickly that numerous mechanisms and policies for monitoring and controlling pupils both online and offline were in place. Technologies played a crucial part in this culture of surveillance with a panoptic ideal of constant yet (frequently) invisible surveillance operating as key in schools' strategies for control.

Examples of this visible yet unverifiable surveillance were numerous in schools – some being more explicit than others. One of the more obvious and visible examples was in one secondary school where CCTV cameras (see below) located around the school grounds are connected to the tannoy system. As the quote below highlights these *could* be used to watch, monitor and regulate behaviour. However as the teacher later noted they do not have the resources to enforce such a monitoring system on a regular basis – however the pupils know it is there, and they know the school has the ability to monitor them.

Yeah, it's [the tannoy system] all connected to the, uh, closed-circuit TV. "You smokers stop"…
[laughter]
Secondary PSHE teacher

Picture 1. CCTV in the playground of one secondary school

Of course these systems have not been introduced with the explicit agenda of monitoring pupil behaviour in this way. We should recognise the potential benefits of such a system – the reduction in break time 'incidents' (fights etc) and general vandalism to the school – and acknowledge that the systems themselves are not necessarily bad. However it is interesting to explore the parallels between this kind of 'on campus' surveillance and the the online surveillance which is also embedded and routinised within schools' everyday practice.

On our visits to schools we built a clear picture of the way in which technology is embedded into the school day. Most schools are equipped with ICT labs; these labs are sometimes complemented with one or two computers being placed in individual classrooms. The schools we visited were on the whole reasonably well-resourced, with secondary schools often having dedicated 'subject' lab areas as well as ICT labs for the core ICT curriculum.

We spoke with teachers about the design of these labs to try and ascertain what informed their structure and the pedagogical implications of this. The most striking feature of almost all computer labs was the layout emphasising individual, isolated working, with the computers predominantly

placed around the periphery of the room. Pictures 2 and 3 provide two illustrative examples from the primary and secondary sectors.

Picture 2. Primary school ICT lab

Picture 3. Secondary school ICT lab

In conversation with teachers about the principles behind the lab design it became clear that the overarching concern was that teachers were able to view every screen at any given time in order to monitor the pupils' computer use. In some schools this was coupled with the installation of software that enabled the teacher to freeze any computer screen at a given time to see what windows were open and suspend the internet for all users. As the teacher below suggests in his comments about this software, the principles of the panopticon appear to be deeply embedded:

> We threaten them with it. So they know… We know, the kids know we've got that capability.
> *Secondary Personal, Social and Health Education (PSHE) teacher*

The pupils are only too aware of these mechanisms of control, as we can see from the discussion between these girls regarding an incident earlier that day:

> *Pupil 2*
> Yeah, some of them can. Some of them can, and what they do is they like sort of lock your computer. [pause] It goes, so it goes, attention please, take your coat off and turn around or something…
>
> *Pupil 1*
> That happened today, yeah. And they're just like, oh, okay. [laughter]… Or just like this big padlock comes on the screen and…
>
> *Pupil 2*
> Yeah, it comes up. And it says turn your monitor off and turn around. It comes up on everybody's. He writes a message on his one, presses enter and then…
> *Year 8 girls*

This culture of surveillance in labs appears to be the preferred model informing classroom design. Teachers in one school were consulted on the design of labs prior to construction (the school was

only a few years old) and they chose to maintain the above layout – not for pedagogical reasons but for the purposes of management and control. However, one lab had been designed differently. It was more innovative in its layout and promoted collaborative working practices (Picture 4 below). The teacher reported that the pupils apparently enjoyed being in this working environment much more, however teachers were not comfortable with the loss of control this created – citing as their primary concern fears that pupils would go off task or abuse access to the internet. (Interestingly, this collaborative lab was one of the few ICT labs we saw which made use of the walls for visual displays. As can be seen in the other photographs most walls were bare or simply displayed posters of 'e-safey' soundbites and/ or rules and regulations governing internet usage.)

Picture 4. Collaborative ICT lab in a new secondary school

Picture 5. A secondary school class with two computers on the periphery

Many secondary classrooms were equipped with computers for general use during subject classes (usually one or two). In each case these were located on the periphery of the room (Picture 5) – an interesting spatial metaphor for the way in which technology is still marginalised rather than embedded in teaching and learning. In the primary context the computers in the classrooms were not for use by the pupils at all, they were only for teacher use.

One final issue that emerged regarding the physical environment of school and the place of new technologies was the visually stark contrast between learning spaces. The pictures below show two contrasting spaces within the same primary school. One – the regular classroom (Picture 6) – is bright, convivial and organised for collaborative learning. The other – the ICT lab (Picture 7) – appears cold and unwelcoming with seating arranged in a way which emphasises individual and isolated approaches to the learning task.

Picture 6. Year 4 classroom

Picture 7. Primary school ICT suite (from same school)

What does this suggest about the way technology is perceived in school and what are the pedagogical implications of this? It certainly appears to suggest that work on the computer is seen as an isolated and individual activity whereas the classroom promotes group work and collaborative approaches. Is there a sense in which what happens with technology is also seen as functional rather than creative and social, or is it that the social and creative is what happens 'inside' the machine, within the digital domain? Is the digital domain assumed to be inherently engaging and stimulating in a way that the 'real' classroom is not?

Surveillance and control of the virtual

In terms of the design of computer labs, then, teachers appear to be primarily driven by issues of management and control rather than by issues to do with online learning per se. If school 'real estate' is organised around monitoring and control in this way, then this is also true of its 'virtual estate', which is even more organised around a culture of surveillance and control.

There is, in today's society both in the UK and globally (Weber and Dixon, 2007), a tendency toward a culture of fear and moral panic around the detrimental and destructive potential of the internet. As Weber and Dixon note, there are contradictory discourses which suggest that, on the one hand young people must develop 'digital literacy skills' in order to survive and thrive in our digital world, yet on the other hand that there is a perceived need to protect young people from the dangers and harm that abound from the vast 'unknowableness' of the internet. This latter discourse, often fuelled by media hype and sensationalism, helps to perpetuate a culture of fear and promotes a perceived need that young people should be shielded from this 'beast'. This 'rhetoric of protection', Weber and Dixon contend (5), simply serves as a justification to restrict and control online access. Within this discourse the digital domain is viewed as risky, dangerous and out of control. This is the context within which the webquests will be used.

In responding to the moral panics created by speculation about the dangers of the internet and an ever-growing number of media 'horror stories', governments, local authorities, educational establishments and parents are reacting by enforcing often extensive restrictions on young people's internet access (Weber and Dixon, 2007; Livingstone and Bober, 2005). In the schools context this has materialised in the shape of prolific internet usage policies and 'e-safety' guidelines and regulations. One teacher we spoke with explained to us the extent of the policies being foisted upon them in the name of 'e-safety' and the challenges she faced in her role as ICT co-ordinator. The extract below perhaps begins to highlight the extent of some of the control measures being adopted in local education authorities and schools. The teacher is under as much surveillance as the pupil:

> Um, just e-safety at the minute. Everything revolves around e-safety because new rules come in about what you can do. So, last week the latest ones were no personal usage of internet whatsoever. The school now gets logs of all usage on the internet, so you now have to say why you've been on that site or why you've looked at that. You cannot access any other email, apart from the school email, even though that

just got introduced two weeks ago. So everyone who was using the school email up until two weeks ago is no longer allowed to access it in school, so it's just horrible. And I end up being the most hated person in school…because I always come in and say, you can't do this anymore, you're not even allowed to use your laptop for personal use. I think in the last two weeks I've sent home three letters to parents [pause] about ICT. One, getting e-safety [pause] signed off, photographic images consent and the Education City content, so it's just absolutely mad, the amount of policies and regulations behind it….But our, [pause] our LEA are just e-safety gone mad.

Year 5 teacher

All the teachers we spoke with expressed concerns about the extent of the restrictions being introduced in terms of internet usage – for both pupils and staff. They spoke of their frustrations in accessing relevant and useful resources to support teaching and learning and the general lack of discrimination shown by the local education authorities when blocking school access to entire web sites. Although teachers were aware that these decisions were made centrally, as the comments below illustrate, the actual process and procedure by which decisions were made to block access were unclear.

Teacher

I think the Civic Centre, I think we've got some crazy 10 Terabit link, but I think it comes straight out of the Newcastle Civic Centre and I think all traffic goes through the Civic Centre. And ultimately, uh, if one of these computers was on, I could show you what the website looks like, but it says, 'all internet access is monitored, the Civic Centre does not allow you access to this domain because it contains references to…', and then whatever it can be, shopping, for example. You can't go shopping between the hours of 8.30 and 3.30, [pause pause] for anything.

Interviewer

[laughter] So who is the Civic Centre, is it a sort of anonymised sort of… Who is that making that decision?

Teacher

You should imagine just one person sat behind a computer, going, mm, this person's been to eBay 20 times today, that can't be very good, they're obviously not being very productive…Let's ban eBay for him. And then, let's ban all shopping. Let's ban… [pause]. So, I don't know. I don't know if it is a person, I don't know if it's automatic, I don't know if it's just purely keywords, I've no idea. But certain things are banned and one of them is shopping, for example.

Secondary science teacher

The extent to which teachers believed they had any control or choice over these restrictions varied somewhat. This teacher, perhaps because she was the ICT coordinator and the policies come directly to her desk, did not believe that she had the authority to request sites to be unblocked.

> We can't request to have a filter taken off, but we can request to have a filter taken on, so if we [pause] manage to get something on the computer that was inappropriate we can ring them and give them the… the address and they'll block it, but we can't request to have anything put on that's been filtered.
> *Year 5 teacher*

Whereas, while this secondary teacher (from the same local authority area) expressed his frustrations at the process of filtering and site blocking, he did believe that he was able to request changes to be made, although the process was not necessarily quick:

> I think some days [pause] the most irrelevant websites, for whatever reason, have been blocked, and it, it seems [pause] quite knee jerky. One day you can get on a website and you think, oh, that will be good to show some kids that, or this particular animation's fantastic, I'll just crank that up halfway through the lesson, give them a bit of a break... And the next time you come to look at it, the whole website or the whole domain has been removed from access. And it's, you know, as a classroom teacher we can ring up the Civic Centre, the Civic Centre then take a look at it, the Civic Centre then can grant us access, and it's all back up and running. But it's one of those things that [pause] it happens so quickly that things get removed that it, it can be an absolute pain. It's obvious why it's there, but it would be great if kids could police themselves, wouldn't it, and we should be able to allow everything.
> *Secondary science teacher*

One of the issues that surprised us most was the apparently indiscriminate way in which some sites were filtered or blocked entirely. Perhaps one of the most extreme instances of this was the restriction placed on some museum websites, as the teacher below explains:

> They've, obviously they've set out certain parameters, so I think anything, if there's any more than a certain amount of flesh showing that's always a no-no… Even the, you know, the National Gallery, you know… it doesn't, it doesn't discriminate between pornography and art.
> *Year 4 teacher*

Given the significance to the project of this issue we asked all of the teachers about access to museum sites. It did appear to be the case that access was not always available to all museum web sites due to the local authority's system for filtering access to inappropriate content. Such filtering is applied to the whole domain, not just individual pages and images within the museum site. This is a very real concern for the project.

It was not just the teachers who were frustrated by the numerous filters and restrictions imposed on internet usage within schools. The pupils also expressed irritation and dissatisfaction about this. Some recognised that there were obvious safety reasons for the blocks; however, many felt that they were simply imposed to prevent them 'wasting' their time or being distracted on the internet, and they believed this was because teachers generally did not trust pupils. Most pupils agreed that it simply served to stifle their online research for school projects, with some even explaining that they

waited until they got home to search where there were fewer restrictions. One boy shared his frustrations in quite an animated manner:

> Oh, there's millions of restrictions, that's really getting annoying… But the annoying thing is, the really annoying thing about the restrictions on these computers that gets me so angry, I'm actually putting my hand up and down really quickly, you can't obviously see that because it's on a tape recorder but the really annoying thing is, you're doing your research and you're looking and you see a picture and you think, 'Ooh, I could put that picture up and annotate it'. You click on it, 'This programme's been restricted'. And what is it, you're like, every single picture is like restricted.
> *Year 9 boy*

> But then again, I think it's about trust again, because the teachers won't probably trust most of the pupils, they'll probably go on different sites.
> *Year 8 girl*

A lack of trust between children and teachers was noted by many pupils – these primary girls told us about the way in which the chat room in their class virtual learning environment is invisibly monitored by the teacher:

> *interviewer*
> So can the teacher see what you've written?

> *pupil 1*
> Yeah.

> *interviewer*
> Do they ever chat to you on it?

> *pupil 2*
> No.

> *pupil 1*
> No. They're sneaky, they just go on and they… They check your files. And you don't know they're there because their name doesn't go on.

> *pupil 2*
> They check your files and everything. Their name doesn't go on, they go on a different thing, um, that adults go on. …

> *interviewer*
> Do you think the teacher should be able to do that or not?

> *pupil 1 and 2*
> No.

> *interviewer*
> Why not?

pupil 1
Because we have some private stuff sometimes.

pupil 2
We should like, they shouldn't be allowed to look at our work because it's our work and not theirs.
Year 4 girls

However, it would be unfair to cast teachers as the 'villains' in this piece – teachers themselves recognised the detrimental affects of the extensive restrictions imposed by local authorities, in terms not only of pupils' academic success but also in the way in which they prevent pupils developing the necessary skills to discriminate and be critical of digital content.

Like even things that happen at home come back on, [pause] on us. So we just have to make sure that, like literally it's wrapped in bubble wrap and not exposed to anything so that it can't come back on us, which is terrible because they shouldn't, they should be shown just how to use it properly and get to most from it and [pause] what to ignore and what not, but…
Year 5 teacher

She goes on to say:

It's just awful. It's just, they're kind of trying to make everything too safe and not let children make any mistakes and protect them too much and [pause] at the same time they're just restricting what they can do.
Year 5 teacher

Conclusion: a context of constraint

There is a sense in which computer use and online learning in schools is characterised by a culture of panopticism and constraint. Children are watched by teachers while teachers – and schools – are watched and monitored by the local authority. At each level, restrictions are imposed, rules are set, sites are blocked and certain activities disallowed in a climate which constructs the internet as dangerous, risky and out of control. Of course, there are aspects to internet usage which *are* risky and awkward for schools to negotiate. At the same time, it is questionable to what extent schools are enabled to teach children vital skills of critical internet usage when the 'riskiness' of the internet is so overly emphasised and controlled. Both teachers and students were deeply frustrated by the lack of freedom they were allowed on the internet.

For the project, one pressing implication of this culture of blocking and filtering is the question of access in schools to the partner museum web sites. This may be something which has to be negotiated with each local authority. It was quite disheartening to see teachers so resigned to the notion of not being able to access public collections online. 'This is their stuff', as one project partner told us in an interview described in our first report – yet it is 'stuff' which in some school contexts is actively blocked for educational use.

On a broader societal level, we see schools being to an extent disadvantaged by the climate of fear, monitoring and constraint created around internet usage. Livingstone and Bober (2005) warn strongly against restricting access in the ways we have described here, and stresses the need for young people to learn crucial internet literacy skills so they can make the most of the opportunities available online, and be aware of the risks that exist alongside these. Shade (2007) claims that what is now required are more positive images of children (in particular she refers to girls) as proactive, web savvy producers and consumers of innovative online content (2007: 238).

This issue relates strongly to the second key theme which we identified during this stage of the research – the issue of digital literacy, to which we now turn.

Becoming 'digitally literate'

The original project implementation plan foregrounded the nurturing of digital literacy as one of its primary benefits and aims. Benefits of the project were to 'encourage critical thinking', to enable 'more confident participation in the digital revolution' and to work toward users' 'increased understanding of the creative potential of the web' (NMOLP, 2006: 10). These aims were reflected on in our first report for the project, in which we discussed the importance of designing the webquests in a way that encouraged learners to develop skills as critical web users, suggesting that 'riskier' webquests might help promote the development of such creative and critical digital literacies. We engage with these ideas again in this report although this time our focus is less on the tensions between performativity and innovation in the educational context , and more on the notion of what we really understand 'digital literacy' to be. We discuss this in relation to the perceptions and experiences of the project resource writers, teachers, pupils and current research in the area.

What do we mean by 'digital literacy'?

What exactly is meant by digital literacy? What did the teachers we spoke with understand digital literacy to be? Within the project, what conceptions of digital literacy appear to prevail? What are pupils' experiences, and can (indeed *should*) we consider them to be 'digitally literate'? These questions arose through our second stage of data generation and we use them here as starting points to help us consider the evolution of webquests within a wider agenda of developing digital literacy. In this section we intend not only to provide a brief theoretical discussion of the issues raised from the data but also to present a picture that illuminates for the project some of the ways in which young people engage with technology outside formal educational contexts.

A view from the inside: teacher and resource writer perceptions

The term 'digital literacy' is itself a problematic one (Gee, 2003; Lankshear and Knobel, 2006; Marsh, 2005; Merchant, 2007), and we will turn to the literature on this shortly. However, it was also a term that quickly became contested in our data as we spoke to teachers and resource writers about what they believed digital literacy was and the purpose of developing 'digital literacy skills' among the partners' web users. The comments provided here illustrate the spectrum and diversity of understanding.

This Year 5 teacher spoke of digital literacy as being able to work with multimodal texts, in particular blending text and image in writing:

> So we've done a lot of freeze frame work, when the children take photographs, that they freeze frame, they print it out and then they make annotations to say what they've shown on the picture…Um, we've used 2Create A Story…where they, [cough] sorry, [pause] have used it for poetry, where they have to make the multi modal text.
> *Year 5 teacher*

Some teachers and resource writers believed digital literacy was about being able to search effectively on the internet – the ability to trawl through the "rubbish" and to make informed judgements with regard to the reliability and accuracy information. This is reflected in the comments below, the first from a resource writer and the second from a secondary science teacher:

> You know, when you're [pause] trying to find something on the web [pause] you come across an awful lot of [rubbish] [laughs] before you get to the stuff that you actually need and get the stuff you actually want… and so I think, yes, so being able to search and being able to [pause] pick out what's relevant and dismiss what [pause] discard what isn't… is a, is a very important skill you need on the internet.
> *Project resource writer*

> Again, as scientists, we, we take that quite seriously and they're doing work now, when we send them out to do research they have to consider that and they have to find, you know, they have to check resources. [pause] If they're finding out some particular piece of science, is it referenced from the actual person or is it a journalist's name, that kind of thing, at the bottom of the article. Uh, have they seen it on two separate websites? What's the nature of the website that they found it on? Et cetera, et cetera, et cetera. So I think, initially, they were kind of taking everything for granted that they saw on the internet, now they're thinking more about the fuzzy aspect and obviously getting to the bottom of it and trying [pause] to work out if what they're reading is valid. It's obviously [pause] still a bit vague at times, but they're trying.
> *Secondary science teacher*

One resource writer believed that while these skills were important, they didn't constitute the whole story. She spoke of the need for learners to be able to think and question any information they come across, recognising that all information and meaning is socially and culturally constructed:

> It's everything, you know, someone's written [pause] stuff for the website, someone's actually decided what goes on the news. Everything's, I suppose it's constructed in a way… So it's getting them to think about you know what information they get and getting them to think about … to question really, question all the [pause] media that they are faced with.
> *Project resource writer*

The conceptions of digital literacy held by both teachers and resource writers, as illustrated above, could broadly be seen to rest within two, somewhat competing, dominant discourses in the current literature and policy context, to which we will now turn.

Digital literacy: just a matter of technical competence?

The first of these discourses is expressed by those who understand digital literacy as referring to a certain level of competence or proficiency (Lankshear and Knobel, 2006; Marsh, 2005; Merchant, 2007). Digital literacy understood within this conceptual framework limits our understanding of it to the mastering of particular skills regarded as essential in order to navigate the 'digital world', and constructs educational aims as being simply to ensure that children are technologically competent and reasonably confident. This conception of digital literacy prompted some resource writers to question whether indeed the project *needed* to concentrate on developing these skills, particularly given that young people today are meant to be 'digital natives':

I was also thinking, I mean, this idea of, of teaching digital literacy skills, which is one thing that we're supposed to be doing, um, uh, through, you know, helping searching and analysing stuff. Uh, um, do we need to do that, actually, because it's often mentioned that kids are digital natives. Um, to what extent do we really need to do that?
Project resource writer

The notion of the 'digital native' is a dangerous one (Bayne and Ross, 2007), and one which is increasingly being subjected to critique. On the one hand, it homogenises learners, describing their relationship to technology in terms of generational positioning when other factors – socio-economic status, gender, geographical location – may well be more salient (Littleton et al, 2005; Kennedy and Krause, 2008). On the other, the discourses surrounding the 'digital native-digital immigrant' distinction have a tendency to marginalise the experience and professionalism of teachers, constructing education in terms of the principles of consumerism, globalisation and 'market need' (Bayne and Ross, 2007; Clegg et al 2003).

It would be fair to acknowledge that the children we spoke to during this stage of the research felt comfortable working in the online environment, particularly when researching information for school projects ('It's easier just to use the internet.' *(Year 9 girl);* 'Yeah, because like, um, the book, books you have to look through a chapter, then go to a page and then read about it, but like with computers you just type it in and you're there.' *(Year 8 boy)*). However, along with the authors of a recent CIBER report on the information skills of the 'Google generation' (CIBER, 2008), we would caution against making the assumption that because learners are technologically proficient and confident that they are necessarily skilled in the use of a search engine or how best to use and interpret the information they access.

A conception of digital literacy that leans toward 'technological competence' promotes what we would see as the 'operational' dimension of literacy (Green, 1988, 1997 cited in Lankshear and Knobel, 2006: 15). Green identifies three interwoven dimensions of literacy – the operational, cultural and critical. The operational is focused more on the technical aspects of language – knowing and understanding the rules, tools and procedures of the language system. These digital literacy skills must be taught. Learners need to know not only how to enter a keyword search, and how and why particular keywords will be more or less effective. They also need strategies for discerning between the most relevant sites, and the skills to extract and process the relevant information after they have located it. From our interviews with teachers and children, however, it appears that often many of these skills are not being taught explicitly, rather they are assumed to be developing implicitly as learners 'do' searches:

Teacher
So when we were looking at Victorians, I gave them a list of famous Victorians and they picked one and then obviously they would search for that name.

Interviewer
Right, okay. And how do they then go about, once the Google search brings up all the different web pages, what do they do to know that one site is going to be more helpful to them than perhaps another?

Teacher
They literally are told the they have to trawl through them. They click on it, see if it's going to be of any use, if not, they go back and they look on the next one.
Year 5 teacher

Yeah, it's just trial and error. Like the teacher will say, uh, go on the internet and find, try and find out about [pause] floods in last June… And, um, you can just, you type it in and go on and you can copy and paste it on to PowerPoint or Word or you can just jot it down.
Year 8 boy

However, teachers did seem to be keen to encourage learners to check the information they gather, and cross-reference across several sources to help ensure accuracy. As we can see from the following comments from children, this was a strategy that was quite well adopted.

That's why I, I always check it after that, see on another site and if it's different to what it is on there then, yeah, then check it again, obviously…Because you never know, though, it might be wrong.
Year 8 girl

Pupil
Um, I might say, if I found it on Wikipedia, to check it I might type it in again and see if the answer what I got was right…by just typing the answer in and seeing what came up.

Interviewer
And does it usually work or have you ever found things that are not right on Wikipedia?

Pupil
Sometimes you find things that aren't that accurate but…normally you can trust it.
Year 8 boy

So although teachers and children were aware of the need to evaluate and sift web-based information, there was a tendency for the associated skills to remain located within the technical and operational dimension of digital literacy. Rather than any real critical questioning of information sources and content, there seemed to be a tendency for these strategies simply to form part of a checklist of internet searching 'to do's'. Indeed the extent to which the pupils in this study genuinely engage with ideas of reliability and accuracy is open to some debate. Ultimately, some observed that the 'real' test of accuracy was whether they got their work right or not.

Yeah. It's [Wikipedia]… you know you can trust it afterwards because if you use it and you get the stuff that you put in from Wikipedia right, so that's how, so like you build up your trust on it.
Year 9 boy

Learners had a wide range of other strategies to help them judge the reliability of information sources. Some looked at the design of the page – for example they questioned whether it looked professional or home made and looked for visual clues such as the colours and icons used, and if appropriate images supported the text. Others noted that information from certain institutions should be trusted. The National Museums sites, when accessible, seemed largely to be counted among the trustworthy:

Pupil
Um, like something about, like if a, like a museum or something, if it were a museum's website then maybe it could [be trusted].

Interviewer
Right, why would you trust a museum's website?

Pupil
Because, they normally, because they, that's all they do, history, so they should be right.
Year 8 boy

This presents an interesting opportunity for the project. The potential is there for the webquests to 'plug a gap' and become an innovative, trusted resource that supports and develops an important skill that learners need. If young people are to become critical web users then these operational skills must be taught, developed, supported and practised. The webquests may provide a safe place for this to happen.

Digital literacy: moving toward the critical

As much as the technical skills discussed in the last section are essential, there is a need to move beyond the operational and technical toward the critical dimension of literacy (Merchant, 2007; Lankshear and Knobel, 2006). We would contend that it is this aspect which is given least attention in education. The critical dimension addresses the notion that meaning is socially constructed and suggests that the skills to challenge and transform meaning should be developed. This second dominant conception of digital literacy follows from Gilster's conception (1997, cited in Lankshear and Knobel, 2006) that digital literacy needs to be understood as involving not only the ability to be competent within the digital world – able to work with multimodalities, to locate information, to navigate hypertext, and to evaluate information retrieved – but also to be able to 'assimilate, evaluate and reintegrate' this information (21). Children need to learn to be critical. Some teachers were only too aware of pupils' tendency still to rely too much on 'copy and paste' strategies rather than spending the time considering and synthesising the information:

They can all copy and paste, [pause] there's very little synthesis that goes on and that is certainly something that's missing now. Uh, in the olden days, you know, their

house may only contain one encyclopaedia, but they'd find something out and they wouldn't necessarily copy it down word for word, they'd have to synthesise it because they're looking at a page full of words. Now, a page full of words is nothing because if you copy and paste it and reduce the font size it will fit onto an A5 sheet, everything's good. And there's very little synthesis goes on, from the weaker kids. Even from the more able kids; the more able kids are 'better' – in inverted commas – because they'll remove things like hypertext links. I still don't think there's that much synthesis goes on there.
Secondary science teacher

Although most pupils were aware that they were supposed to write out the information in their own words and not copy and paste it, the extent to which this was done varied:

Sometimes you copy and paste it, you copy and paste the bits which are quite easy to understand, but other bits where there are big blocks of writing you just read it through and then turn it into…
Year 9 girl

So it seems that the educational culture of 'cut and paste' which was highlighted as problematic in the original project implementation plan (NMOLP, 2006: 4) is still current, and that the original project aim of providing 'alternative models' to this is still much needed. The challenge is significant, however. As Merchant (2007) has argued, it is a question of confronting what we mean by literacy in its broadest sense, developing our skill and understanding of symbolic representation in a digital world where multimodal texts are mediated easily through the screen, and an ability to 'decode' the visual – icons, pictograms, logos and other visual features – must sit alongside skill in interpretation of the printed word (121).

Conclusion: implications for webquest design

The issues raised above have some significant implications for the ongoing development of the webquests.

It has been claimed that the literacy practices of school are becoming increasingly divorced from the literacy practices of home (Marsh and Millard, 2006). The wide range of texts – on and off screen – that young people engage with outside formal educational contexts are often distinctly different from those they are presented with in school. Young people are both consumers and producers of texts that challenge the structures and rules of traditional literacy. Blogging, texting, messaging (MSN or similar), email, social networking, chat rooms and forums, and online gaming place greater emphasis on collaboration, user control, choice and authority – the child can be the expert on their own blog, within a specialist forum, exchanging hints in an online games forum. There is a shift in how texts are viewed. Merchant (2007: 122) suggests a number of ways in which these shifts are evident. We outline below those that may have greatest impact upon the design of the webquests:

- digital texts are fluid rather than fixed
- they are complex, interrelated and hyperlinked
- they are are becoming multivocal and collaborative

- the linearity of texts is challenged – reading and writing paths become mobile and multi-linear

Webquests will be received by users whose experience and expectation of online texts will assume many of the above characteristics. It may then be wise to consider now how the webquests may be designed to embrace some of these features. Although we recognise that some of these may not be possible for the project at this time, others may be more feasible to adopt: Is there a predetermined pathway through the webquests, for example, or are there possibilities for choice and control on the part of the learner to create their own pathway through careful use of hyperlinking? To what extent are the webquests able to embed a range of media – image, sound, text, and other visual signposts? What help is embedded in terms of built in, scaffolded activities that help learners construct keyword searches?

For a critical approach to web use to be nurtured through the webquests, there is a sense in which the webquests need to take risks – to open the web up to children's critical capacities, rather than to contain it within an overly safe, structured and managed experience. This is something that teachers themselves were keen to see implemented in the design:

Interviewer
Do you know what webquests are and do you ever use them in class?

Teacher
No and no. I have seen similar things. Uh, and they tend to take the form of being a microsite and then you can search within that microsite to find out the information. But for some of our students that's quite restrictive because it's literally clicking the right button in the right order to find everything and then copying and pasting it. So my experience of that kind of activity has been quite negative because they are very restrictive in, and they take the kids down these very formal lines of operation and there's no deviating from that.

Interviewer
What would they have to be like to be good?

Teacher
It needs to give… the kids the opportunity to search beyond, you know, the ten pages in the microsite. It's, the internet is there as a whole and trying to restrict that access and trying to condense it to what somebody or a team of people or a group of people think are the facts and the important bits, uh, isn't giving the kids that opportunity. And to me, fundamentally, that seems wrong.
Secondary science teacher

This theme of restriction, of making the web 'safe', is one which we have already discussed in the context of surveillance and site blocking. It also informs the issue to which we now turn – that of the culture of gaming among children, and the intolerance children appear to have for educational

gaming environments which do not engage with something of the 'riskiness' and difference of the digital mode.

Serious play: webquests and the culture of gaming

> The first thing I tend to look for is the game button.
> *Year 8 girl*

> …because every good website has to have games!
> *Year 8 girl*

Research appears to show that video gaming has become a significant part of young people's lives (Gee, 2007 and Gunter et al, 2007) – a claim which is certainly true for all the children involved in this study. Every child we spoke to talked about gaming in some shape or form, to the extent that it often seemed as though their expectation of interaction with online resources was one *structured* by the experience of gaming.

It is not our intention in this report to present an in-depth discussion of the nature and purpose of gaming, the intricacies of game design and the ways in which it does or does not support learning. However, given that gaming emerged as a significant theme in our conversations with pupils about their use of the internet and new technologies, we have explored this theme in some detail in relation to current research in the field, with a view to considering to what extent a gaming approach might inform elements of the design of the webquests. By looking at some examples of games children love, and of another they do not, we aim to provide some insight into what these discerning and experienced users of digital environments might find appealing in terms of webquest design. We do recognise that the design and ongoing development of the webquests are constrained technically and issues of longer term sustainability must be considered, therefore we are not advocating that the webquests be redesigned to become 'games'.

The educational potential of gaming is a relatively new field of research and while the literature is somewhat limited there are some interesting and influential texts emerging. For example, Gee (2006) provides a good discussion about the potential of gaming in education, while Gunter et al (2007) provide an interesting argument in relation to game design in educational contexts. For this report we are drawing partly on the work of Gee as a way of understanding what the 'gaming approach' might have to offer the design of the webquests.

Gaming in education: is it just about 'fun'?

Games are often used in educational contexts as a way to engage children – perhaps because they are seen to be fun and therefore 'motivational':

> But what kids like are things like little games. We've got some revision games for Key Stage 3, and Key Stage 4, for that matter, and it doesn't matter how pathetic the game is, they love to get involved… And it's just [pause] trying to tap into what they like and they like games. So if you could package something that looks like a game, they're all for it.
> *Secondary science teacher*

> And from my experience, the way to get kids to, through to anything is through
> games… it's through interaction, it's nothing to do with the adult, um [pause] they
> discover that [pause pause] and I think that's kind of [pause] it's where I'd like
> museums to go….   as a way of bringing children in…   I think there could be much
> more wizzy things and [pause] exciting things for them to do… that would have a
> kind of, a learning element but the children wouldn't really see that… but they'd be
> [pause] doing quests and… and fighting off whatever.
> *Project resource writer*

Teachers who recognise the potential use of games in education tend to regard them predominantly as such motivational tools, encouraging children to engage in drill-and-practice style interactions to master content (maths games are particularly popular), or using games as a 'carrot' to encourage pupils to complete their work – they are then 'rewarded' with time to play a game, usually at the end of a lesson:

> They can earn themselves little certificates and what have you. But a lot of them
> have gone on, funnily enough, and it's good because it's a way of practicing, but in a
> very fun way. . . It's reinforcing, it's very, yeah, it's very much a reinforcement
> programme.
> *Year 4 teacher*

> And if they get through their work and they get enough points, it means that they
> can then go on to one of the interactive games . . . So basically they dangle a carrot
> in front of [the children].
> *Secondary PSHE teacher*

There is undoubtedly a case to be made here – computer games can be fun, they can motivate and they can interest children. This may be particularly true in an educational context where a relatively simple computer game may, by comparison, be much more engaging than a page of 'sums' from a textbook. But is this really the extent of the potential of gaming in education – the 'fun' factor? Or is there something more? What makes a game good? What can we learn from popular games such as *The Sims* and *Wii Sports* or Massive Multiplayer Online Role Playing Games (MMORPGs) such as *World of Warcraft*, *Guild Wars*, *Pirates of the Caribbean*? And where and how does this fit with the webquests?

Gee (2007) identifies three main categories of principles that underpin good games, and that might relatively easily be transferred to the design of learning activities within the school context. These features align closely with the underpinning principles of social constructivism, some of which were identified in our first report. Good games **empower learners**, they **encourage problem solving** and help to **develop understanding**. What follows is a brief discussion loosely structured by these underpinning principles, considering how they relate to the issues raised by teachers, pupils and resource writers in interview, and how they might inform the webquest design.

Empowering learners: choice, customisation and identity

Games that empower learners allow the player to be involved in their co-design, they are customizable, they engage actively with players' negotiations of identity, and they enable players to manipulate knowledge in some way (Gee, 2007: 30-32).

Co-designed games encourage the player to interact with and participate in the game – he or she is an active participant and is given opportunities to make choices. It is choice, or at least the *perception* of choice and control, that appears to be important. The order of play, the level of difficulty, and the characters' actions are decided by the player. This perception of choice appeared to be a significant factor for pupils in our study when they talked about the advantages of interaction with online artefacts:

> Yeah, sometimes racing and sometimes like sports games, like I play tennis on it or something… And it's good because it's like you make your own player sort of thing and you sort of get lost and it's really you doing it sort of thing.
> *Year 8 girl*

> *Interviewer*
> So what makes these games so good?
>
> *Pupil*
> Uh, because you get to like [pause] choose who you want to be and like what alley, what city in the country or what country you want to be in… And you can choose what language you want to speak in and at the end it also teaches you the language of, the language you're speaking in.
> *Year 4 boy*

> I sort of like it because you can do your own thing really, you can choose what you want to do, [pause] and it's not some, it's not got instructions and things like that, like tutorials. And you can just skip everything and it's really, it's just nice because you don't usually get to choose what you're allowed to do….It's just, [pause] it's really good fun. It's like [pause] games on PlayStations, some games [pause] they're a bit boring because it tells you what to do, but things like *Sims* and games like that, you can just choose how they live and what they do
> *Year 4 girl*

There are very few activities these children will engage in at school that offer this same level of perceived choice, control and ownership. To what extent are the webquests designed to allow a level of choice and control by the user? This was an issue identified by one resource writer who recognised the importance of giving children choices within the webquests to help them feel like they have a sense of ownership over the task and their own learning:

I want to give them a chance to take things up in their, in their own directions and not for them to have something to compare to – 'here, here's what we think is the right answer, how well did you do?'. You know I want them to just, have the, you know, have a chance to just make a decision and [pause] be pleased with themselves that they have chosen something they think is right.
Resource writer

One important, and highly immersive, aspect of this ability to control and direct the game play is that of identity building (Gee, 2007), emphasised by two of the children in the quotes above. Good games engage players by allowing them to create and form an online identity, either through the creation of an avatar, or as they take on the persona of the game's central characters (being a 'scientist' or a 'monk' in *Civillization*, or the new kid in the neighbourhood in *The Sims*). The player becomes part of the game as they make choices on behalf of their virtual persona.

One resource writer identified some of these features as key elements of game design and spoke about how these might be transferred to the webquests. She spoke of getting children to think about what a particular scenario or historical context is like from the *inside* – for example, taking on the role of someone from an ancient civilization to develop deeper meaning and understanding and to motivate them to find out more.

Where a game fails to immerse the player in this way, or fails to provide appropriate elements of choice and control, users will disengage. It is perhaps important to remember that these children are experienced gamers and have high expectations of online artefacts designed for learning. *Linguascope*, for example, offers a series of mini-games aimed at language learning – vocabulary in particular – which are largely imported from existing paper-based models of game interaction (wordsearch, hangman, pair-matching and so on). There is little attempt to engage in digital modes of game-play – little player choice, no opportunities for customisation, no identity play[1]:

Pupil 2
And *Linguascope*, God, that is so boring.

Interviewer
Why is it boring?

Pupil 1
Because it's just a load of French words and…

Pupil 2
Yeah. It's, it's the same game over and over and over again. It's just crap.

Interviewer
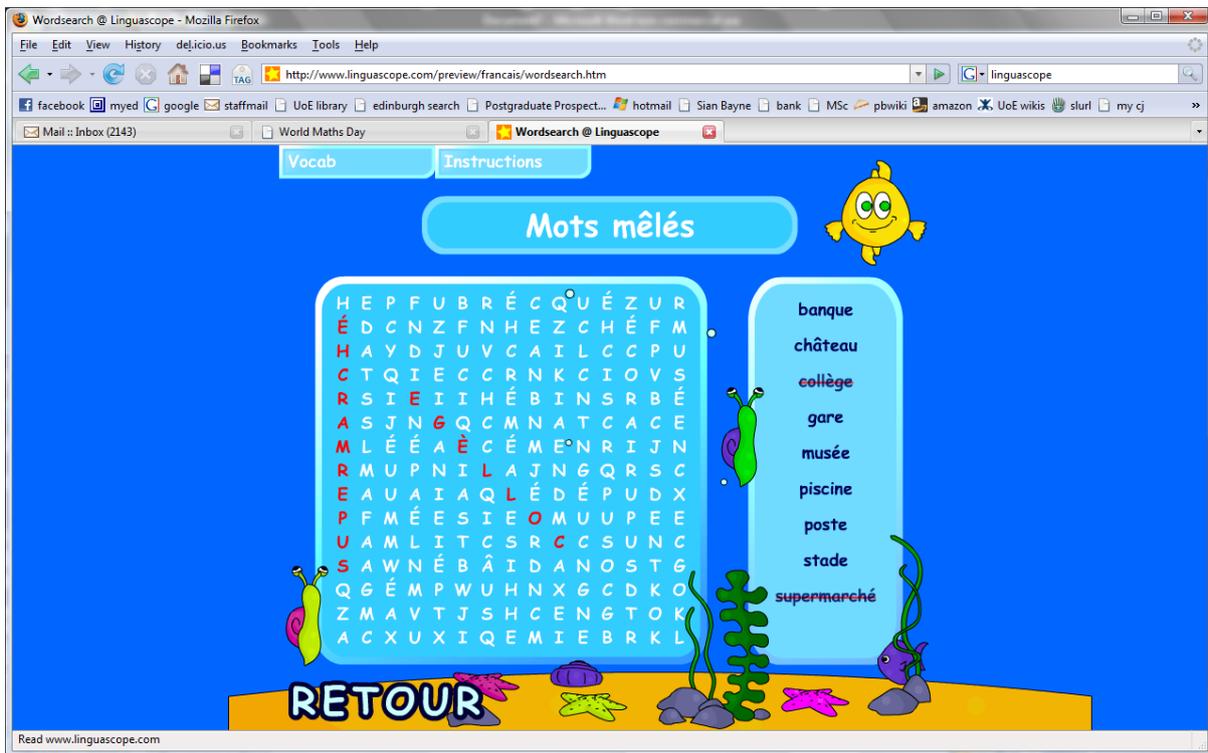So there's not enough there to keep it interactive or to keep your interest going?

Pupil 1
No, there's nothing, [pause] there's nothing that's going to actually keep you wanting

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[1] View a trial of Linguascope online at: http://www.linguascope.com/

to keep on doing it.
Year 8 girls

Linguascope

Problem solving: challenging abilities and scaffolding development

Gee (2007) argues that good games ensure the problems players (or learners) face are appropriately challenging and well-supported. This requires designing play that does not simply take the player 'by the hand' (Gee, 2007: 35) but is rather designed carefully to help the player-learner navigate through the problem with opportunities for support as required. These challenges need to be at the upper end of the individual's capabilities.

When the game play is matched to the individual's ability level in this way, and the goals are suitably motivating for the player to want to achieve them, players tend to engage with the game. One maths game children enthused about appeared to embrace several of these principles – providing suitable mathematical challenge, motivation to proceed to higher levels, drawing the learner into the character and storyline of the game[2]:

Pupil
We played this brilliant game in Maths this morning, this morning right. Where it was, where it was like a, it's like a, what is it, sort of a, what's it's name, [pause] like you know these like beat em up games, like fighting games, it's like more them, when you answer

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[2] Supermathsworld is available free at http://www.supermathsworld.com/

questions and you get to use your attacks really good. So like, what is it you get, so what is it, like the more powerful the attack the harder question.

Interviewer
So you really want to get the hard questions so you get the powerful attack?

Pupil
Yeah, it's like that, really, it's like that. You just like, what is it, basically you've got damage and all that, and you do your health sort of thing, and yeah it comes up with a question like what's this shape, or something like that. You click it and you do damage to the enemy and you need to do it before they damage you. And it's called *Supermathsworld*, it's really good.
Year 9 boy

It is interesting to compare the ethos and design of *Supermathsworld* with that of *Linguascope*. Both are fundamentally 'drill-and-practice' games, yet the aesthetic of the former is entirely informed by the culture of video-gaming – a combative, oppositional design model accompanied by a hectic techno soundtrack, a significant degree of level choice, pumped-up superhero avatars and a breathless, time-limited pace. The sedate, restrained, puzzle-book ethos of *Linguascope* is entirely absent from this game.

Supermathsworld

Where development of learners' abilities needs to be scaffolded, we can again draw on Gee's (2007) insights into how support and feedback are integral to successful instances of game design. Such support, he suggests, must be provided 'on-demand' and 'just-in-time'. As players reach new levels, require new skills or need to learn a particular strategy they are able to request and receive information as and when they need it. As something new is introduced into the play a 'just-in-time'

information box may appear, which the player can usually choose whether to read or ignore until later. Game designers realise there is no point overloading the player with too much information at the start, particularly when much of it will not be needed until later in play. Similarly, a player may realise they do not know what to do, they may require hints, information or feedback on their current play – at this point they may choose to retrieve a help box, or a strategy sheet 'on-demand'. As one girl mentioned above, players like to be able to choose if and when they need the tutorial in a game. In thinking about the webquests, we might consider whether learners are being overloaded with information at any point? Can information be 'chunked' and available at the point of need?

Another strategy to provide appropriate support may be via the provision of sandboxes, which offer a 'safe' space for the player (Gee, 2007). Sandboxes provide a low risk simulation of real play with a higher level of support – for example by giving less choices or requiring fewer unnecessary actions to complete the task. In these spaces the player is taken through the key skills or strategies required to achieve the goal but without the risk of losing a life. Similar principles could be applied to the webquest design with the creation of activities that perhaps build on or help to develop certain skills but within a low risk environment – such as creating a supported task on searching, helping pupils to identify key words for searching, trying these and then extending their new skill into the 'real' context of the web.

A final important aspect of game design is the attention given to providing feedback to the player. Feedback in gaming tends to be constructive and directly supportive of the game play. It is not seen as an end point of the game and an assessment of what went wrong with no opportunity to try again – players are often provided with supportive hints and tips to help them achieve the next task or mission. Integrating useful, constructive feedback within the webquests is likely to be particularly desirable, for example providing interactive quizzes, games, or other 'stop and think' moments which may support children in self-assessing their own progress and perhaps helping highlight what they need to do next in order to develop further.

One educational resource that seemed to embrace many of the principles we have identified was the World Maths Day[3] online challenge. This involved children playing online maths games competitively with other children around the world. Taking place in real time, the game was intended to build children's skills in mental arithmetic. Nearly every pupil we spoke with referred to the World Maths Day games positively and the teachers who were involved with it also recognised its strengths:

> But what was really good about it was that the children, they did it, it's graded, so they do it at their own level. Um, then, they were really excited about going online with other children in other parts of the world…   So, you know, they could be playing children in Australia or North America or all sorts of weird and wonderful places. Um, and which they loved. And they got instant feedback on it…. So it tells you if you got it right or not… Uh, and they just like it, it's a competition, you know, the element of competition, but at the same time they thought about it really well, so they had things like they all could create their own little avatar, [pause] which was fun… And then the more points, they could score points, and so they could customise

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[3] http://worldmathsday.com/

them… And they could add hats and, you know, sunglasses and all sorts of things, you know, so it was a real, they really enjoyed that.
Year 4 teacher

The principles of well-timed feedback, a competitive and motivating structure to game-play, choice over level of engagement and immersion through identity play with avatars were all present in this game – with the added feature of a global 'reach' which is genuinely unique to the online, digital mode:

It's really funny, I was playing there and, uh, it was searching for people from other countries which are playing right now, and the thing was, um, a person from Pakistan, in my school came, and I was playing against him. Yeah, really. I used to go to that school and someone from that school, I was playing against him… That was a really good game, it was a really good game… It was really good. It was really, really, really fun.
Year 8 boy

World maths day

Not only did the World Maths Day online games provide suitable challenge, support and feedback but it was also built upon another key factor – the social and competitive dimension. The pupils made frequent reference to the social dimension of gaming – engaging in specialist forums and chat rooms to exchange tips, talking online with fellow gamers during play, engaging in friendly competition with friends, and sitting with a friend or relative while playing and talking about strategy. We recognise that it is beyond the aims of the project at this time to develop these social

capabilities within the webquest strand of the project, but it seems there are exciting opportunities here for future development.

Conclusion: on to the next level

We would like to be clear that we are not advocating that the webquests should be redesigned to look like games. However, we do think that some of the principles which appear to inform successful educational game design might be applied to the webquests. In summary, these are:

– the introduction of certain level of choice and control by the learner

– the inclusion of opportunities for immersive identity play through the construction and customisation of avatars and characters

– the ability for the player to choose levels, to match 'play' with their own ability level in a meaningful way

– the provision of 'on-demand' and 'just in time' support

– the provision of 'safe' spaces for practising

– timely feedback which directly supports and progresses play.

Beyond this, we take from this stage of our research an understanding that it is the distinctive strengths of the digital mode which most engage learners in such environments. Games, or learning resources, which are primarily informed by analogue or paper-based precedents (*Linguascope* for example) appear to bore children – there is a real sense in which their engagement with the digital is purely tokenistic, and children see through this quickly. Learning opportunities like *Supermathsworld*, which deliberately employs a digital gaming aesthetic and a combative game structure, or *World Maths Day*, which uses the global reach of the internet within a competitive approach to game design, appear to engage children instantly. These are learning opportunities which have been 'born digital'.

A brief overall conclusion: why the webquests are needed

We have identified a significant tension in schools between the educational possibilities of the rich, open, 'risky' web and the perceived need to contain this riskiness in the interests of children's safety online. This tension has emerged across the key themes explored in this report – those of surveillance, of digital literacy, and of the culture of gaming.

There continues, then, to be a real opportunity for the project to make a difference to the way in which the internet is used for learning in schools. Project webquests can be 'deployed' by teachers as a way of challenging local authority policy on web site blocking, a policy which appears – in some local authority areas at least – to actually deny access by the public schools sector to the national collections. The webquests can also be structured in a way which allows teachers to nurture in children a genuinely *critical* digital literacy, in an educational climate in which cut-and-paste still dominates. And, perhaps by taking on board something of children's tendency to understand the internet in terms of the culture of gaming, the webquests offer the opportunity to re-think what a genuinely engaging and immersive online learning experience might be.

As project research partners, we look forward to investigating – over the coming months – the extent to which the webquests contribute toward such change in school online education.

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