

**Personalising learning: the learner perspective and their
influence on demand**

Final report

April 2008

Carol Robinson, Judy Sebba, Duncan Mackrill and Steve Higgins

Universities of Sussex and Durham

Research team:

Lori Altendorff, Barbara Crossouard, Frances Hunt, Jae Parsons

Contents

The research team.....	4
Schools and colleges involved in the project.....	4
Executive summary.....	5
1. Access to resources	5
2. Support.....	6
3. Learner demand and learner influence.....	7
4. Recommendations and policy implications.....	8
Introduction and overview.....	10
2.1 Origins of the project	10
2.2 Aim of the study.....	10
2.3 Understanding personalising of learning	11
2.4 Overview of report.....	12
Access to resources	13
3.1 Access to DTs in schools and colleges	13
3.2 Access to digital technology outside schools and colleges	15
3.3 A sense of ownership and learner engagement	18
3.4 Staff as a resource	19
3.5 Learners as a resource	20
3.6 Financial resources	21
Support	23
4.1 The support of the headteacher and other staff.....	23
4.2 Technical support.....	23
4.3 Continuing professional development	24
4.4 Parental involvement and support.....	25
4.5 Support from Ofsted	26
Learner demand and learner influence	27
5.1 Learner-led activities	27
5.2 Learner influence and involvement.....	28
5.3 The use of DTs to personalise learning and enhance the inclusion of specific groups of learners	32
5.4 The use of DTs to address non-pedagogical concerns	34
5.5 Measuring the impact of using DTs.....	36
Conclusions and recommendations.....	37
6.1 Conclusions.....	37
6.2 Recommendations and policy implications.....	38
6.3 Outstanding issues.....	40

Appendix 1 – Selecting the case-study institutions.....	41
Appendix 2 – Methodology.....	42
Appendix 3 – Glossary of terms	44
Appendix 4 – The Diamond 9 Activity	49
Appendix 5 – Aspects of practice that might be transferable	54
References.....	55

The research team

Core team

Carol Robinson (project manager), University of Sussex
Duncan Mackrill, University of Sussex
Judy Sebba, University of Sussex
Steve Higgins, University of Durham

Field researchers

Lori Altendorff, University of Sussex
Barbara Crossouard, University of Sussex
Frances Hunt, University of Sussex
Jae Parsons, University of Sussex

Administrative assistant

Catherine Holley

Schools and colleges involved in the project

Primary Schools

Clunbury School, Shropshire
Halterworth School, Hampshire
Hunwick School, Durham
John Davies School, Nottinghamshire

Secondary Schools

Shavington High School, Cheshire
Simon Balle School, Hertfordshire
St Paul's Catholic College, West Sussex

Sixth Form Colleges

Queen Mary's College, Basingstoke

Schools with special educational needs provision

Dove House, Hampshire
Overton Grange School, Sutton

Our thanks

The research team would like to thank the learners, staff and governors of the schools and colleges visited for the co-operation, support and time that made this research possible.

Executive summary

The research project 'Personalising learning: the learner perspective and their influence on demand' was commissioned by Becta. The overarching aim of the project was to find out how learners and their representatives have influenced schools' decisions to introduce, support and grow opportunities for personalising learning through the use of technology.

1. Access to resources

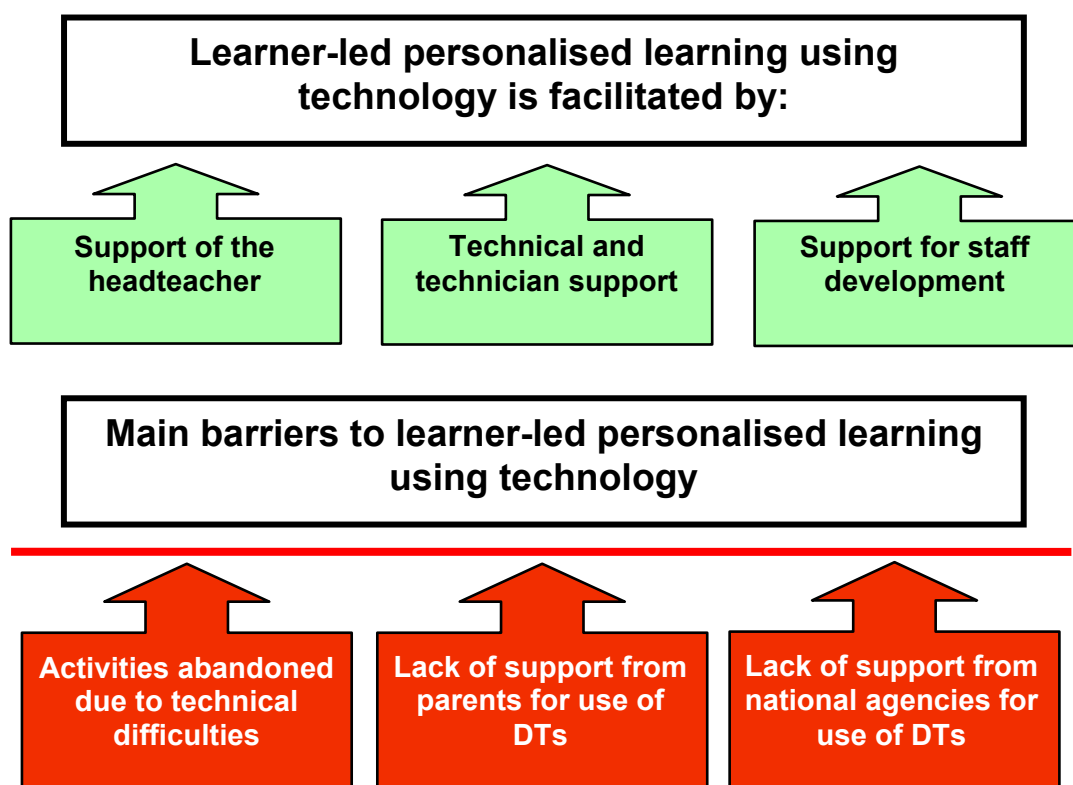
- 1.1 A wide range of digital technologies (DTs) were being used even by the youngest learners and those identified as having special educational needs. The quantity and variety of DTs varied from institution to institution and within departments/classes in institutions. In some institutions there were pockets where DTs were being used to support learning; in others, DTs were more widely integrated across the whole institution.
- 1.2 Where software and DTs were available for whole classes it tended to increase the teacher's capacity to facilitate the personalising of learning and increase learners' influence, and to respond to demand.
- 1.3 Learner-led personalised learning can be facilitated by DTs when learners are given the opportunities to develop skills and confidence in using technologies progressively throughout their school careers.
- 1.4 Acknowledging and building on the technological skills and confidence that learners bring to school or college was associated with increased learner-led personalising of learning.
- 1.5 Where learners were engaged with and had access to a range of DTs the capacity for learner-influenced personalised learning was greater and learners had the freedom to use resources in the way that they chose.
- 1.6 When staff thought they had ownership of a particular digital technology this resulted in it being used more frequently to support learner-influenced personalised learning.
- 1.7 Key staff with skills and confidence, who are keen to experiment with different technologies, are pivotal in supporting the use of technology to enhance learner-led personalised learning. Such staff were likely to be less prescriptive about the DTs which learners used to complete and present work, and to have the confidence to devolve some control to the learners.

- 1.8 The flexibility developed in the 'any time, any place' element of learning platforms may lead over-conscientious learners to spend a disproportionate amount of time on schoolwork at home.
- 1.9 Some DTs that seem to be providing support to learner-influenced personalised learning outside schools and colleges are those more likely to be discouraged in school or college, for example mobile phones.
- 1.10 The ways in which institutions restricted internet access varied. At times this resulted in learners having difficulty accessing sites that they or their teachers thought they could benefit from using.
- 1.11 The purchase and maintenance of DTs was reported as requiring substantial initial and significant ongoing financial investment. Institutions tended to be able to find money to purchase resources to initiate development work in DTs, but experienced difficulty in allocating funding for sustaining or upgrading their current level of resourcing.
- 1.12 The large-scale investment in networked systems for the tracking and monitoring of, for example, pupil attendance, can provide resources that can then be exploited for other purposes, in particular for learner-influenced personalising learning.

2. Support

- 2.1 The role of the headteacher was crucial in developing and sustaining the use of DTs in schools and colleges. The headteacher gave support by: allocating funding for investment in digital resources; being willing to finance professional development courses for interested staff; supporting initiatives proposed by staff and from outside school, taking action to deal with assessed risks and encouraging staff to fully engage with DTs that were new to them.
- 2.2 It is essential that adequate levels of technical support are available in institutions in order to deal with problems as they arise and to keep the resources in regular use. There was evidence of some institutions enlisting the help of more experienced learners to help others when they faced technical problems with their laptops or PDAs.
- 2.3 When support systems for DTs had been developed in-house to suit the needs of learners and staff this led to staff feeling more confident about using them.
- 2.4 Lack of support from parents for the use of DTs discouraged schools from personalising learning through their use.

2.5



3. Learner demand and learner influence

- 3.1 Evidence emerged that DTs were used in a small number of schools and colleges to personalise learning by giving learners opportunities to lead the learning. There were examples of learners requesting particular DTs through mechanisms such as the school council.
- 3.2 The use of DTs to support personalising of learning was more often initiated by staff and further developed by learners. Hence 'learner influence' might be a more accurate description than 'learner led'.
- 3.3 Staff and infrastructure tend to provide the framework through which learners are able to make relatively minor decisions. Learner decision-making appeared to happen more at the classroom level, where decisions had already taken place about the mode of technology to be used, although learners often had some say in how technology was used.
- 3.4 It is difficult to measure the impact of using DTs. Staff ultimately want to increase attainment; however, in many cases, the reason for introducing

various technologies was to increase learners' interest in, and engagement with, learning.

- 3.5 There was evidence of DTs being used to support learners with specific needs. In some cases, this resulted in students being able to learn in a more independent way, without the support of teaching assistants. There were examples of computers with British Sign Language and other assistive technologies. However, in some cases, there was still a need for specialised teaching assistants, for example to make notes for hearing-impaired learners because they were unable to lip-read and write notes at the same time. This requires teaching assistants with touch-typing skills, which not all of them had.
- 3.6 Schools and colleges are often faced with challenges in providing opportunities for personalising learning for some groups of learners, for example learners on the autistic spectrum.

4. Recommendations and policy implications

- 4.1 Where there is evidence of learner-led and learner-influenced personalising of learning supported and enhanced by DTs, examples should be made available more widely through websites, conferences and in National Strategies material. Consideration also needs to be given to further ways in which such practices can be transferred to other institutions.
- 4.2 The skills and understanding of DTs by learners, including young learners and learners with a range of special educational needs, should be better acknowledged and built upon.
- 4.3 Some institutions create flexible opportunities for learner-led personalising of learning while at the same time successfully meeting curricular and assessment requirements. Ways in which they do this should be subject to further discussion and analysis at national, local authority and institution level.
- 4.4 There is a need to look at the processes which schools and colleges use to embed personalising of learning with DTs since sustainability of effective practice is still too dependent on specific teachers.
- 4.5 In keeping with the Byron recommendations, a more consistent approach should be adopted for internet access. Becta's self-review framework assessment incorporating e-safety should provide the basis for schools' internet regulation, which should be reflected in each school's acceptable use policy. In addition, as the Byron report recommends, all schools and children's services should use an accredited filtering service. Emphasis should be placed on equipping learners with the confidence and skills to navigate the internet safely.

- 4.6 Ongoing work with Ofsted and other national agencies is necessary to ensure that a shared vision for learner-influenced personalising of learning through the use of DT is developed and communicated to schools and colleges.
- 4.7 If different DTs are used for different types of learning outside and inside schools and colleges (also reported by Underwood *et al.*, 2008), there are implications for the recommendations made by the Home Access Taskforce.

Introduction and overview

2.1 Origins of the project

In March 2005 the Department for Education and Skills (DfES) published its e-strategy, Harnessing Technology. Two of its key objectives were to:

- transform teaching and learning and help to improve outcomes for learners and young people through shared ideas, more exciting lessons and online help for professionals
- engage hard-to-reach learners with special needs support, more motivating ways of learning and more choice about how and when they learn.

The research project 'Personalising learning: the learner perspective and their influence on demand' was commissioned by Becta. It forms part of Becta's broader role in shaping and delivering the Government's Harnessing Technology strategy.

2.2 Aim of the study

The aim of the study was to find out how learners and their representatives have influenced schools' decisions to introduce, support and grow opportunities for personalising learning through the use of technology. The five research questions addressed were:

1. How have the demands of learners and their experiences of technology outside school affected planning, teaching and assessment in their schools?
2. For which initiatives in this area does the school have evidence of effective impact, and what might be possible in the future?
3. (a) How have different groups of learners (eg hard-to-reach learners, minority ethnic groups, gender-specific groups) been affected, and which learner demands have had the greatest impact on which learners?

(b) What are the contextual factors that have facilitated impact? Which aspects of practice are most likely to be transferable across contexts (i) in the school sector and (ii) across educational phases?
4. What have been the implications for continuing professional development for (a) teachers and (b) teaching assistants and other adults?
5. How have impact and added value been measured and evaluated?

Thus, the project sought to find cases where learner demands have had an impact on school planning, influenced school decisions about resourcing, and affected

teaching and learning methods. Pivotal to the study was gaining an understanding of how learners' demands about the ways they want to learn have shaped their school experiences.

The distinction between this project (Research 25) and other Becta projects on personalising learning (in particular Research 18.1) is that this study looked specifically at the impact and future potential of learner-led ideas for the use of technology to personalise learning.

2.3 Understanding personalising of learning

Previous research into personalised learning by Sebba *et al.* (2007) found that participation was key to understanding personalised learning. This is emphasised by Ainscow (2006) who suggested:

'... learning is a personal process of meaning-making, with each participant in any activity 'constructing' their own version of that shared event. The implication is that even in what might be seen as a rather traditional lesson, with little apparent concession being made by the teacher to the individual differences of members of the class, each pupil defines the meaning of what occurs in relation to their previous experience. In this way, individuals do inevitably personalise the experience and, in so doing, construct forms of knowledge that may or may not relate to the purposes and understandings of the teacher.'

This view of personalised learning has two implications. First, that in order to increase the opportunities to personalise learning, teachers need to draw out and build on prior experiences. This is not a new idea, but it can be challenging to implement effectively. Secondly, this view implies the need for more formative assessment which draws out the diverse knowledge and understanding that individual learners may acquire during a lesson. This suggests that there is a need for higher-order questioning (eg Baumfield *et al.*, 2005) and assessment for learning (Black *et al.*, 2003).

The national policy on personalised learning in England was launched at the North of England Conference in 2004, where Miliband stated that personalised learning could be described as:

'High expectations of every child, given practical form by high quality teaching based on a sound knowledge and understanding of each child's needs. It is not individualised learning where pupils sit alone. Nor is it pupils left to their own devices – which too often reinforces low aspirations. It means shaping teaching around the way different youngsters learn; it means taking the care to nurture the unique talents of every pupil.' (Miliband, 2004)

Students might experience personalising of learning while working individually, in small groups or in the whole class. Thus, personalising of learning cannot be equated with individualised learning, but it may include it. Underwood (2007), drawing on some of the wording of the original Miliband speech, defined the personalising of learning as:

‘The tailoring of pedagogy, curriculum and learning support to meet the needs and aspirations of individual learners irrespective of ability, culture or social status in order to nurture the unique talents of every pupil.’

Thus, in this research we sought examples that appear to create learning opportunities in which teaching is shaped around the way different young people learn. It is not about the identification of predetermined learning styles, but rather about teaching being responsive to ongoing direction and feedback from learners. In this sense, learners influence and sometimes lead their own learning, which in the context of this project is sometimes enhanced by the use of technology.

2.4 Overview of report

This research project is about how learner demands have influenced ways in which DTs are used in schools to help personalise learning. The findings are divided into three main sections: sections 3, 4 and 5. Section 3 discusses the availability of resources, and section 4 addresses issues around support. These two sections contribute to describing the context in which learner demand and learner influence may be developed. The key findings that directly address issues relating to learner demand and learner influence are reported in section 5. Section 6 outlines the conclusions and recommendations arising from our research.

Access to resources

3.1 Access to DTs in schools and colleges

3.1.1 More use of a range of technologies, some in pockets, some embedded

In general, the case-study institutions were using a wide range of technologies, including DTs, even with young learners. This resonates with the findings of Underwood *et al.* (2008) who noted a growth in the use of mobile technology, although in our discussion of findings from the Diamond 9 activity (see Appendix 4) we report on the learners' views of the technologies which support learning and note the apparent continued dominance of computers. (Similar findings were reported by Underwood *et al.*, 2008.)

The quantity and variety of DTs varied from institution to institution, as did the degree to which these DTs were embedded into the day-to-day experiences of learners. In some institutions, there was evidence of pockets of use of DTs to support learning. In other institutions, DTs were integrated into the whole school or college experience. So, for example:

In one secondary school, a large percentage of learners (96 per cent) had broadband internet access at home, and the school learning platform hosted a large amount of teaching materials, homework tasks and resources. Learners were often asked to self-assess and to peer-assess the work of other learners which had been uploaded onto the learning platform. The deputy head commented:

“That might be through a forum... so a piece of work will then be posted onto the forum, and students are then invited to choose one of those and to respond to that. So they will actually grade it or they will offer comments about the strengths and weaknesses of it.”

Learners also used the learning platform to interact with one another about school or college work as well as social activities. Classes held online fora where debates on certain subjects took place. A further use of the learning platform in this school was as a repository for learner activities, events and initiatives, for example videos of school performances featuring information written by learners.

The music department in a further secondary school used a web-based music education site (NUMU) to enable all learners to upload and publish their compositions. This dedicated safe space for students enabled their own teacher, as well as teachers and learners in other institutions, to listen to and comment on their work. The head stated:

“Having their own safe space within a school website, which is attractive enough for them [the learners] to want to use it, with the safety element built in, is one of the biggest challenges for schools.”

She also acknowledged that:

“They [learning platform providers] want the students’ personal space – virtual personal space – to look attractive and be inviting and engaging enough without being on YouTube or My Space. Now we have succeeded with that to a certain extent with NUMU...”

At one school with special educational needs provision, a range of software was installed on individual computers, and classroom learners had access to one computer each. This enabled learners to choose which programs to use in lesson time. As the headteacher commented:

“A child whose writing is pretty awful can use a word processor and they come out with a finished ‘wow’ bit of work, but they can take it one step further and add bits from Photoshop and the various drawing packages we’ve got. And then we’ve got cartoon programs, and they can use these if they want to. They can do this sort of thing in most of their work; they decide how to use the computer for their work. They might decide they want to use the digital cameras for something, so we would get them out and let them use them to add to their work.”

3.1.2 Widespread, regular and flexible access to DTs enhances learner-influenced personalising of learning

A key finding across the case studies was that where software and DTs were available for whole classes it tended to increase the teacher’s capacity to facilitate the personalising of learning and increase learners’ influence and/or demand. This may partly reflect the fact that the technologies were easily accessible on a regular basis. An example of this can be seen in a music department using NUMU (see 3.1.1) where learners have access both as whole classes in school and also as individuals at home.

There were some examples of access to DTs being restricted through booking systems or other organisational processes, or staff lacking confidence and skill in using the technologies. This meant that the resources were not readily and flexibly available to appropriately support the learning. In addition, a small number of institutions restricted the use of computers and learners had to request access, leaving DTs under the control and direction of staff.

3.1.3 Facilitating learner-led personalising of learning through providing opportunities for learners to develop skills and confidence in using technologies

Learner-led personalising of learning can be facilitated by DTs when learners are given the opportunities to develop skills and confidence in using technologies throughout their school careers. It was acknowledged by some of the staff we spoke to that it would be beneficial to use a variety of DTs in school, from reception onwards, in order to equip learners with a range of skills and the confidence needed to use these DTs. Some staff also commented that when different classes used the same DTs this resulted in the technologies, and the skills needed to use them, being transferable from class to class for both staff and learners.

3.1.4 The need for internet regulation sometimes constrains learner-influenced personalising of learning

Gaining access to particular websites was an issue for some children and young people. Due to restrictions imposed on internet access by some institutions, learners had difficulty in accessing sites they could benefit from using. One group of learners in a secondary school suggested that unblocking sites becomes a challenge that learners rise to rather than getting on with the work. At the same school, a Year-9 learner (female) noted:

“It’s almost like, they shouldn’t filter everything, they should filter people who are using it because people like us, we’re not trying to look at weird stuff, we’re just trying to do our work whereas, it’s better to filter the people who are doing it rather than the sites...”

In some schools, particularly primary schools, there was evidence of learners regulating their internet use themselves. This resonates with Sandvig (2003), who found that when young people accessed sites which contained nudity on the first page, but the bulk of that page was a warning cautioning minors not to enter, no further pages were viewed. Attewell (2004) considers that efforts need to be made to equip children and young people with the skills needed to judge which sites it is appropriate to access. Alternatively, or in addition, the development of more sophisticated control software is a potential solution.

3.2 Access to digital technology outside schools and colleges

3.2.1 Some DTs that seem to be providing support to learner-influenced personalised learning outside school or college are those more likely to be discouraged in school or college

Our findings indicate that learners use some DTs outside school or college which they are not encouraged to use, or in some cases are actively discouraged from using inside school or college. For example, results from the Diamond 9 activity

demonstrated the significance of mobile phones, MSN, chat rooms and social networking sites such as Facebook and Bebo. (Similar findings were noted by Underwood *et al.*, 2008.) However in some cases both learners and teachers, in particular at secondary level, confirmed that learners were increasingly using these sites to check their homework and for other school-related activities.

Some of the case-study institutions are currently looking at ways in which learners can make use of DTs such as mobile phones (with their additional functionality) to take photos outside school and incorporate them into classwork. One secondary-school teacher cited an example of a learner who had used a mobile phone in this way:

“I had student who came away with me on a field trip to do geography, and a lot of them used their phones for photographs. When we came back to the classroom... I had one girl that said to me, ‘Do you mind if I use my phone?’... she actually had it in the middle of the table and then she was Bluetoothing her photographs to other people on the table who have laptops. So all the students on her table immediately got her photographs.”

In the same lesson the photographs were uploaded onto the learning platform, allowing learners in other classes to access them too.

3.2.2 There was evidence of learners using technologies outside school or college to support personalising of learning, but a lack of access for some learners meant this was inconsistent

The increasing use of computers and the internet and the development of online learning in institutions can lead to the assumption that learners have access to the relevant technologies outside school or college. Some institutions acknowledged that not all learners have a computer at home, or that sometimes access is limited by the need to share with other family members, or is inhibited by the space in which it is situated. These institutions often make provision for computers to be used in school or college outside of normal hours.

A recent large-scale study into the use of school computers at school by learners who live in children’s homes (Kent and Facer, 2004) reported that young people were concerned that ‘schools did not allow young people sufficient time to develop activities, and were insufficiently responsive to their interests’. Learners therefore see out-of-school use as a domain over which they can exercise greater control.

There were instances of laptops being leased to learners and parents through the school. In one of the case-study secondary schools parents who chose to be part of the laptop scheme paid a set amount on a monthly basis and in return their children were allocated the sole use of a laptop in and out of school. Only two families in the

school decided not to take part in this laptop scheme or did not have computer access at home.

At one secondary school, a learner who was following a BTEC music course used a computer program, Sibelius, for composing music. This software was available in school; however the learner also made extensive use of Sibelius at home to compose music for her GCSE which she took in Year 10. Now in Year 11, she is working towards her AS level.

A potential tension arises between on the one hand developing more flexible systems in order to encourage personalising of learning, and on the other giving learners more influence, which may also result in additional pressures. For example, concern was expressed that the flexibility developed in the 'any time, any place' element of learning platforms might lead over-conscientious learners to spend a disproportionate amount of time on schoolwork at home.

3.2.3 There was evidence of personalising learning through parental support via school or college websites

Some institutions encouraged learners to use the school or college website at times when parents or carers could support learners and help them gain greater control over their learning. For example, at one primary school a new initiative was the formation of a homework club team consisting of learner representatives, a teacher and a parent governor. The team is currently looking at ways for the school website to be set up for computer-based homework, to increase learners' motivation to do their homework and to give parents more support in assisting their children.

Some school websites encouraged links between parents, learners and the school by allowing parents to view their children's work and, in some cases, to comment on it, as in the following case described by a Year 5/6 learner:

"We share work more with our parents with ICT; for example, on the blog – it's more interesting for parents than looking through our books. The parents can see the work of all children and not just yours and can make comments. We also edit each other's work and get more ideas about how you can improve your work. You can keep in touch over the holidays, or when the school is closed, or when you're not at school."

3.2.4 Use of DTs outside school or college provided a means to link home and school

In some cases DTs were used by institutions to promote closer links between the school and the community. For example, many institutions sell DVDs of children's performances at school concerts and plays. Following student requests, one secondary school also began making podcasts of its 'rock school' gigs.

In addition, learners also weave aspects of their world into school by, for example, bringing in their own DVDs relevant to the topics being covered. In this way, learners are given greater control over resources for learning, and their prior experiences can be acknowledged, thereby personalising the subsequent learning.

3.3 A sense of ownership and learner engagement

3.3.1 When staff thought they ‘owned’ a particular DT this often resulted in it being used more frequently to support learner-influenced personalised learning

When staff had access to interactive whiteboards in their own classrooms these tended to be used more regularly, since this gave staff opportunities to experiment and become more knowledgeable about the whiteboard’s functions, which in turn often led to increased use (Higgins, 2003).

The importance of staff feeling they own a resource was acknowledged by one of the heads we spoke to. He suggested that when buying, for example, interactive whiteboards, staff should be involved in discussions with suppliers about which model would best support their intended uses in the school.

A textiles studies teacher at a school with special educational provision had recently asked for, and received, funding from the school to purchase specialist equipment which allowed learners to design and print fabric. This teacher had a sense of ownership over the new equipment, which was located in her own classroom, and she was viewed by others as the owner. She also felt at ease taking the resource home to experiment with it, which resulted in her being more familiar with its functions.

While it is important to acknowledge the benefits of teacher collaboration, the development of learner-influenced personalised learning may benefit from opportunities for teachers to gain greater skills and confidence in the use of DTs through their sense of ownership of a resource.

3.3.2 When learners were engaged with, and had ownership of, DTs the capacity for learner-influenced personalised learning was often greater

Learners particularly liked the idea of ‘owning’ resources in school and having one each rather than needing to share (McFarlane *et al.*, 2007). This gave them the freedom to use a resource in the way they chose, rather than having to compromise and work with others.

At one primary school, learners used PDAs to search the internet for information which was of interest to them.

“If you check with [the teacher], you can look up other stuff to do with what we are doing in class. It’s good ‘coz you can find out anything!”

For learners to influence personalised learning, they must be sufficiently engaged in their learning. Findings from discussions with primary-school learners demonstrated that learners considered technology-based work to be more enjoyable than written, teacher-dominated or book-based work. As one primary learner commented:

“We really wouldn’t find it [learning] nearly as fun, because with the ICT and things and the multimedia room recording and video and things like that, showing it back to everybody at school, that’s fun, but if you’re not having fun learning then you’re not gonna want to [learn]. That’s why we have all this stuff.”

3.4 Staff as a resource

3.4.1 Staff with skills and confidence in the use of technology enhance learner-led personalised learning

In some institutions, the headteacher, an assistant headteacher or one or more of the senior leadership team seemed to be the driving force behind the use of technology to enhance learner-led personalised learning. The concern is that if the use of DTs is not fully embedded when key staff leave the school or college, other staff may lack the knowledge and motivation to lead and continue with these activities.

One secondary school has instigated a system to develop capacity and sustainability by having an ambassador in each department who promotes technologies to others and targets continuing professional development at other staff.

Staff who are keen to experiment with different DTs, to take risks, to trial new ideas and to explore the use of such technologies in different learning situations are necessary for progress in learner-led personalised learning to be realised.

3.4.2 Staff need both skills and confidence to take risks in enabling learner-led personalised learning

When considering the use of DTs to enhance personalising of learning, it seems that it is necessary for staff to have a relatively high level of confidence in the classroom, as well as for them to be confident and knowledgeable about DTs (Windschilt and Sahl, 2002). Where both of these characteristics were present there was a greater chance of staff building the use of technologies into their teaching, and of them being relatively less prescriptive about the DTs learners used to complete and present work. In such cases staff were more likely to have the confidence to relinquish some control to learners, to give freedom of choice over content, and to allow learners to lead the class.

At one school, a group of Year-2 learners were completing work on the fire of London, which involved research. The learners worked in small groups, and each was given the opportunity to record its findings in the way learners chose. Most groups opted to use some form of digital technology such as a PowerPoint presentation, word processing or video. The teacher acknowledged that giving learners this level of freedom involved an element of risk (in terms of classroom management), and that teachers needed to be confident about their pedagogies in order for this approach to be effective.

“That can require some confidence, particularly with IT, on behalf of the adults to be able to give guidance and support.”

There were cases, however, of some staff reporting that they did not have sufficient time allocated to familiarise themselves with the available technologies.

3.5 Learners as a resource

3.5.1 Acknowledging and building on the technological skills and confidence that learners bring to school and college was associated with increased learner-led personalising of learning

Many learners are knowledgeable about a range of DTs which they use out of school and college; however, even where there were reports of informal learning between learners and teachers, schools and colleges sometimes only acknowledge and build on these. For example, we found that learners reported that MP3 players and iPods were commonly used outside school or college for digital recording, but rarely used as a way of presenting work or to aid learning.

One secondary school cited an example of MP3 files of songs that reflected the mood of a Bible theme being used in religious education lessons. Learners were encouraged to use their mobile phones or iTunes to identify relevant music.

Our findings show that learners as young as four already have the skills to compile a PowerPoint presentation, but that opportunities at school to utilise and develop these skills are sometimes wasted because of teachers' insufficiently high expectations of learners. Underwood *et al.* (2008) also found that young learners were familiar with and able to use a wide range of technologies.

At a primary school where staff recognised the skills in digital technology that learners bring to school, one member of staff commented:

“It's good old-fashioned cross-curricular work. We're recognising that children are coming from homes that are rich in technology. So to not have that as a tool in their learning [at school] would be just crazy. It's pushing the boundaries and keeping up with what is going on in homes.”

There were times, however, when learners lacked sufficient confidence in the use of particular DTs to be able to apply skills independently.

3.5.2 Where learners' skills and confidence were recognised, this was sometimes developed into peer-tutoring and support arrangements that further enhanced personalising of learning

A primary school that recognised that some learners were particularly knowledgeable about certain DTs and computer programs used these strengths to help establish class 'experts'. For example, some learners had siblings who were involved in the school's PDA project the previous year, and through this the younger learners had learned how to use many of the features of the Pocket PCs (PDAs). These younger learners helped both their peers in class and the teacher to demonstrate and teach many of the skills needed. In this school the learners had previously been involved in digital video and other projects, and so had become adept at transferring files to and from computers.

As well as learners bringing in knowledge of DTs from outside school and college, some learners also know how to solve technology problems, and they become the school's e-technicians to help others with their learning (see section 4.2 Technical support).

3.6 Financial resources

3.6.1 Institutions able to source funding have the technological capacity to create opportunities for learner-led personalising of learning

Our findings show that allocating dedicated financial resources to allow simultaneous access to technologies for a whole class was essential for the development of DTs in a school or college. It was reported that substantial initial and ongoing investments were required.

Knowledge of funding sources and the motivation to access them was one way in which institutions were able to purchase DTs.

One school was in the fortunate position of having recently moved to a new site, and this provided the opportunity to incorporate up-to-date DTs into the new building.

3.6.2 Resources were allocated to equipment that was considered to meet an identified need rather than investing in technologies that might support learner demand

Understandably in most cases institutions focused on fulfilling objectives, and they purchased equipment only when there was a direct need for it. This reduces the potential for learner demand to be generated by investment in new DTs. Investment

in new DTs is a higher risk strategy that is likely to be less prevalent when resources are limited and prioritisation is necessary.

In one school, the large-scale investment in networked systems for tracking and monitoring provided resources that could then be exploited for other purposes, in particular for learner-influenced personalising of learning.

3.6.3 It was more difficult for institutions to allocate funding to maintenance and repair than to new developments

Institutions tended to be able to find money to purchase resources to initiate development work in DTs, however, they experienced difficulty in allocating funding to sustain their current levels of resourcing. This was particularly the case for consumables and repairs (McFarlane *et al.*, 2007). In one primary school, the cost of repairing and replacing Pocket PC screens was prohibitive and caused the use of the technology to be restricted (see also ITSS, 2007). Upgrading system capacity is a further significant expense, as noted in two schools that were linking up their systems to bigger databases.

3.6.4 Financial constraints

When institutions are not located in affluent areas they cannot rely on parents to supplement resources, as may happen in other schools. This also has an impact on home–school links since resources accessible at home will vary. The cost of some software and licences is high; for example, voice-recognition software.

Support

4.1 The support of the headteacher and other staff

4.1.1 Headteacher support was identified as critical to the sustained use of DTs to enhance learner-influenced personalising of learning

The role of the headteacher was crucial to the allocation of funding for investment in digital resources that could be used to enhance learner choice. Headteachers funded professional development courses for interested staff, supported initiatives proposed by staff and sought out external funding. Strong leadership was key to the effective exploration of DTs, and in all cases where headteachers were not directly involved, they supported the member(s) of staff responsible for ICT.

4.1.2 Specifically, the headteacher was reported as supporting staff to take risks in their teaching to enable development of learner-led personalising of learning

Examples of headteacher support were found in the encouragement of staff to fully engage with DTs that were new to them. This is considered an essential ingredient of personalising of learning (Williams *et al.*, 2000). As one head commented:

“The fear was of doing things differently, so you need to wrap them in a structure that is supportive and enabling. [You need to] know your team, the same as you have to get to know the children, know their starting points. [Then] give permission to try things out [and] if it doesn’t work out, enjoy what you have learned from it.”

At another school, the assistant head commented:

“We’ve worked quite hard to create an innovative curriculum so that staff feel quite free to take risks and try new things... there isn’t a blame culture... it’s made a difference to the way people feel... they feel they’re trusted to run with things, try things which are new.”

4.2 Technical support

4.2.1 There was some evidence of activities being abandoned due to technical difficulties with the equipment

Once DTs were up and running in institutions it was essential for technical support to be adequate to deal with problems as they arose and to keep the resources in regular use. There were examples of institutions not providing this kind of support, which resulted in equipment being rendered unusable. However, in one of the secondary schools there was a dedicated team of enthusiastic staff who had both pedagogical and technological expertise and who were on hand to give support to teachers and to source materials for them.

The maintenance and repair of DTs continues to be a challenge. There were cases where access to DTs was limited because the equipment had been damaged. For example, at one primary school the teacher had encouraged the use of Pocket PCs at home in the previous school year. A small number of breakages meant that the school now only had one Pocket PC per person, thus if children left their Pocket PCs at home, there were no additional ones to use, and this restricted what the teacher was prepared to do with them.

Damaged equipment was also found to be an issue for schools involved in the mobile learning project in the same local authority, where the evaluation (ITSS, 2007) noted a problem with the fragility of the screens. This has also been identified as a problem in other mobile learning projects, particularly for secondary schools (McFarlane *et al.*, 2007). Although the issue is probably related to specific technologies, Attewell (2004) reports findings from a European-Commission-funded study with older learners in which about 3 per cent of mobile devices were stolen and only 1 per cent damaged.

4.2.2 Learners in some institutions provided technical support which then enhanced the running of the equipment and enabled personalising-learning-focused activities to continue

One secondary school enlisted some learners to help other learners when they experienced technical problems with their laptops. Initially, staff identified computer-competent learners and asked them if they wanted to help. The laptop helpers, known as e-technicians, were allocated a desk space in the library next to the IT technicians, who gave the learners some training on the hardware and software and supported the helpers when requested. According to staff at the school, an added bonus of this system was that some learners who were sometimes seen as less social than others became e-technicians, and the requirement to work with others helped them develop their social skills, which gave them credibility. Further developments planned include learners using the digital noticeboard in the learning resources centre to inform learners about a particular computer virus or about training they plan to run.

4.3 Continuing professional development

4.3.1 Staff development was more effective when it addressed the specific needs of staff (and learners) in the school

Our findings demonstrate that where support systems for DTs had been developed in-house to suit the needs of learners and staff, this led to staff feeling relatively more confident about using them.

At one of the schools for learners with special educational needs, staff training in the use of DTs was a regular feature in meetings for teachers and support staff. Additional support was also given to groups of staff when requested. As the head commented:

“ We all get a little package telling us how to use it. And because we’ve got so many computers now, they [the staff] take it away and they can try it... And consequently, it seems the staff are confident and keen to use new ICTs... I suppose because the training is in house, it’s created specifically towards the needs of the children here.”

4.3.2 Just-in-time professional development was seen as more responsive to unforeseen needs

In some cases institutions followed a just-in-time approach to skills training to support the use of DTs and adaptation to learners’ interests (Granger *et al.*, 2002). So, for example, if a class needed to understand how to insert pictures in PocketWord, the teacher would show a few learners, and the learners would then teach the other members of the class. This approach was used only to support a particular activity when learners needed to acquire the skill immediately. Similarly, the development of skills in using an animation program and voice recording was influenced by the learners’ interests.

4.4 Parental involvement and support

Our findings show instances of parents supporting their children by taking time to view their work on the school website. At one primary school, learners used their own initiative and uploaded podcasts created in school onto their MP3 players, the podcasts were then shown to parents and grandparents. One teacher reported a child’s reason for using the technology in this way:

“I’ve put it on here so my grandma can listen to it because she’s not got internet.”

4.4.1 Parental resistance to personalising of learning sometimes limited an institution’s ability to extend opportunities for learners

Where parents were not in favour of their children using DTs in school this was found to discourage schools from personalising learning in this way. In one primary school a minority of parents were opposed to using PDAs at home. The teacher thought that this limited how the school could develop the technology for personalising learning, and was concerned that some learners would lose out. Overall, however, the school found that parents were very supportive of the school’s use of other DTs.

In another school, parents indicated caution not only about the use of technology but also with the notion of personalising learning and allowing learner choice. As one parent commented:

“He shouldn’t make a decision on which way he is learning... there are other people far more skilled to do that, so... you shouldn’t give him a choice... it should be a fixed curriculum of what he should be taught.”

A parent from another school voiced disapproval that more time was not spent on writing:

“There is a bit of over-reliance upon IT, perhaps to the detriment of, from my personal point of view, creative writing I think. Not enough time is given to children sitting down with a pen and writing ‘til their hand hurts.”

4.4.2 Some institutions provided training sessions for parents in the use of DTs to enhance personalising of learning at home

One of the schools organised digital technology classes to teach parents how to use a range of computer programs. The idea was to increase parents’ understanding of what their children were doing in school. However, because the support was offered to parents during the day it was less accessible for working parents.

Another school ran an e-learning café for parents which gave them the opportunity to ask questions about the school’s learning platform.

One school had recently opened a cyber café which it additionally hoped would be used in after-school clubs. This school was considering providing access to parents so that they could see how their children used computers in school, with the aim of increasing parents’ capacity to support learning through the use of DTs.

4.5 Support from Ofsted

One school thought it had received insufficient support from Ofsted when developing its use of DTs. In a recent inspection report, although the use of ICT in school was noted as an improvement, and the school was currently leading in this area both locally and nationally, the inspectors believed that the overuse of computers for writing had had a detrimental impact on the quality of handwriting and learners’ presentation of their work. The report further indicated that while the use of ICT had considerably enhanced the skills of learners and teachers, it had made demands on staff which in turn had meant that other priorities were overlooked. In the headteacher’s view this criticism was unjustified, and she believed that the school had responded to earlier criticism from Ofsted relating to an under-developed use of ICT, and that there was not enough time or flexibility in the curriculum to excel in all areas.

Learner demand and learner influence

5.1 Learner-led activities

5.1.1 Evidence emerged that DTs were used in a small number of institutions to personalise learning by giving learners opportunities to lead the learning

There are some examples of DTs being used to help learners manage and lead their own learning.

A Year-12 learner was not able to attend college for one lesson, but was able to actively participate in the lesson, at her own request, via the learning platform. This learner asked a friend to text her when the lesson started, she then joined in the lesson through the learning platform. During the lesson she submitted work to the active online forum and uploaded a resource so that she could ask other learners what they thought of it. As described by the class teacher:

“I was able to send [the pupil] a response from the forum to say thank you for your contribution; now you need to do... so I was able to interact with this student who wasn't even in the class, and she was taking part in what was there, but it was her instigation.”

A further example of learners in this school making the decisions about which technologies to access in order to personalise their learning was expressed by the headteacher:

“We set up a homework club which I run... and it started in the community room downstairs, and teachers can send kids there if they want to, if they're not doing their homework... And then one of the kids said... 'I need to do a PowerPoint for my World War Two research', and I just said, 'I'm sorry, we're in here and I can't just let you go into the IT suite because you're unsupervised, just in case something happens.' And then a kid asks me the week after and I just thought 'Why are we sitting in here? Why can't we just sit in there and do it in there?' So... now kids do their homework in there.”

5.1.2 In some activities, learners took on a teaching role

Learning platforms enabled learners to manage aspects of their learning.

At one school, the English department supported a Year-8 learner who set up an initiative to encourage all Year-8 learners to read more. This learner decided on the content for the learning platform. A teacher described the initiative as follows:

“He's put some Flash animation in there, he's actually put links to websites that review certain books that they're studying this year. And he's also

written his own reviews on books that students are reading this year, and I think he's in the process of inviting other students to submit their book reviews as well. So he's created that quarter himself, he's created the content..."

The learner involved confirmed that the activity was learner-managed and that the content was not checked by teachers.

When the learners led their own activities and took on aspects of the teacher's role such as leading others, they were reported as remembering more about the activity.

In some cases, learners are more knowledgeable than the teachers they work with about DTs; this can be threatening for some staff. The literature on student voice (eg Fielding, 2004) suggests that teachers find it difficult to make the transition from the traditional role, in which they are expected to know more than their pupils in all areas and be able to provide answers and control the learning.

While there are relatively few examples of learners fully leading through the use of DTs, many examples were found of learners influencing classroom activities.

5.2 Learner influence and involvement

5.2.1 The use of digital technology to support personalising of learning was more often initiated by staff and further developed by learners. Hence 'learner influence' might be a more accurate description than 'learner led'

In many of the case-study institutions, it became apparent that decisions about the use of DTs were often made by members of staff. It was common for learners' representatives, whether they were teachers, teaching assistants or other members of staff, to choose the DTs which they considered would interest learners. As one teacher described:

"Our head, he looks at what the kids want and works from there; it's very much a case of 'Would the children enjoy it? Excellent, right, how can we then make it meet what we're supposed to be teaching?'"

Similarly, another teacher's perceptions about learners' interests played a major role in the development of activities with favourite software (eg Sketchy, a simple Pocket PC animation program), exploiting PDA capabilities (e.g. for voice recording) and using games consoles such as a Nintendo DS for peer-to-peer testing in maths.

In one primary school a class teacher developed a series of activities using the children's cartoon animations to extend classwork, based on the children's interests. The children completed the animations for a competition to raise money for Children in Need. They also recorded interviews about events in school and then edited them for the school radio so that the wider school community could access them.

An example from one school where DTs were purchased with the knowledge that learners would enjoy using them was cited by a teacher. The software allows learners to design products for a zoo gift shop, and learners were able to use the software in the way they chose.

“ One of the boys decided to make a cushion to sell at a gift shop in a zoo, so he did some research on the internet into fabrics to use, then he decided on one and was able to photograph that, then there’s a facility to trace the design off and remove the background and change the colours, so he did that and the children are just gobsmacked with it.”

5.2.2 Learners evaluated teaching and learning and fed back their observations to staff

In one primary school learners undertook ‘learning walks’ in which they observed and video-recorded lessons in their own and in other local schools. The aim was to highlight what was liked about the schools and what could be reproduced at their own school. As one Year 5/6 pupil described:

“The learning group go to other classrooms in school and in other schools to look at the atmosphere in the classroom, what’s good about their displays and how children are working. [The learning group considers] what things help you learn better and what things you need to try and improve.”

Learners then feed back their findings to staff at their own school. The headteacher commented:

“The children have to learn to be very diplomatic in their feedback and have to identify positive features that help pupils to learn.”

5.2.3 Learner involvement in decision making ranged from minor to major decisions

Examples were given of learners making decisions of varying levels of importance about their use of DTs. When asked what decisions they made, learners in one of the case-study schools talked about being able to change the font colour, add a background to PowerPoint presentations and project some of the pictures onto the school’s plasma screens. At the other end of the scale, some learners were given opportunities to choose which technologies best suited the researching, recording and presentation of their work.

At one primary school Year 5/6 learners completing themed work on the 20th century were given the opportunity to decide what work to cover and how to present it. One learner wanted to interview a local resident who was a World War 2 evacuee, and

she recorded the interview as a podcast. Others chose to present work as a PowerPoint presentation, and some chose to video their work.

Staff in another school commented on how learners are regularly allowed to make decisions about how their work is presented. The deputy head stated:

“Very often we suggest to the students, well, it’s up to you how you create [the] information, you can do it as a presentation, you can do it as an audio file, as a podcast... and then you can upload that to the VLE.”

At several institutions learners self-assessed and peer-assessed work through the learning platform. Some learners were given the criteria for assessment and specifically requested to comment on the strengths and weaknesses of the work and, in some cases, to grade it. Where learners self-assessed, they were asked to mark their own work and indicate why they awarded themselves a particular grade.

At one institution learners were involved in implementing an individual tutorial system to replace the previous group system. The change was partly as a result of the school listening and responding to learners’ perceptions of the low value of group tutorials. Although they did not initiate the system, learners did influence how the system now operates:

“Clearly, if you look at our tutorial system and the IT backup that we have for that in terms of the Vista system, students did not initiate that system... It is about responding to individual need, and obviously to be able to respond to those needs, you need to engage with them, and you need to let them have an input into what you’re doing. You have to take account of the perspectives of the learner in order to deal with the issues that you as an institution face.”

There were several instances of institutions continuing to use, or increasing the use of, particular DTs as a result of positive feedback from learners. For example, the enthusiasm of learners from one primary school about using PDAs ensured their continued use. The project had initially been supported by the local authority, but was continued independently by the school. The local authority evaluated the initiative positively (ITSS, 2007).

Some institutions actively sought the views of learners on, for example, learning platforms, which helped to shape future activities.

There was evidence of learner input into learning platforms used for career-development planning: a college student had responsibility for designing web pages to support learners in their career choices. Ongoing consultations through the student council focused on ways in which learner input can be increased.

Thus staff and infrastructure provide the framework through which learners are able to make relatively minor decisions, and it is often the teachers who instigate and see the changes through. It seems that in order for changes to be made, staff have to approve of learners' suggestions. Learner decision-making appeared to happen more at the classroom level, where decisions had already taken place about the mode of technology to be used, although learners often had some say in how the technology was used.

At one secondary school learners were very positive about being able to choose the material they performed and who they played it with in music lessons. However, where learners were required to upload their practical work onto a website so that others could listen to it, there was some resistance from learners, since they wanted only their best work to be uploaded.

“Not everybody wants everybody else to listen to their music... because I can't play the piano that well, and I practise at home, but then when we were told we had to upload our piano tracks to [the website] it was like, well I don't want to and everyone is going to listen to it... you have to evaluate everyone else's, you just don't want other people to listen to your music...”

5.2.4 Instances of teachers and learners resisting opportunities for learner-led activities due to national assessment requirements limited learner-led personalised learning

The National Curriculum and associated assessment led teachers to perceive it necessary to follow tightly scripted programmes of study. In particular, GCSEs and key stage tests were a concern to both teachers and learners. Teachers expressed criticisms that curricular and assessment requirements reduced their capacity to personalise learning:

“...But how does that sit with the courses we're offering... we've got a programme of study that they've got to study and be assessed on, but within that, are there any areas that we can go in more detail? And to be honest, some of the courses we do are very limited, in that we've only got set times to do set amounts of work, so they haven't got two weeks at the end or in the middle of a course to go off on their own little tangents to do personalised learning.”

(See also findings from Underwood *et al.*, 2008.)

Institutions perceive themselves to be judged on test results, and this view restricts the development of learner-influenced personalising of learning in two particular ways. First, there is a reticence to transfer greater control to learners when the content perceived to be necessary for high-stakes testing might not otherwise be covered adequately. In addition, given the importance currently attached to summative assessment in the English context, there is a tendency for schools to

invest in DTs that track and monitor grades rather than to invest in technologies which might enable learners to engage in more meaningful assessment for learning, a key component of personalising of learning.

5.3 The use of DTs to personalise learning and enhance the inclusion of specific groups of learners

5.3.1 There were many instances of assistive DTs being used to support learners with specific needs

One secondary school was considering voice-recognition software to help learners with special educational needs take notes and become less reliant on support workers, for example when homework is read out.

This school was considering the acquisition of predictive text software for some learners. Teachers believed predictive text software would be particularly useful for one learner with cerebral palsy because although this learner could read very well, he could not find the keys on the keyboard and as a result his typing was very slow.

At another school, provision was made for learners who find writing at length difficult: learners were able to record their work in different ways, for example onto MP3 players or digital video cameras. A learner with Asperger's syndrome who found writing difficult used podcasts to communicate his work. This boosted the child's self-esteem and had a positive impact on how other children perceived him.

In some cases learning support assistants were involved in determining which software would suit the needs of learners with whom they worked; for example, a learning support assistant suggested the use of software suitable for learners with visual and hearing impairments. This learning support assistant had also designed a page on the computer which featured icons and links to websites relating to a learner's personal interests. This initiative was designed to support a learner who found reading difficult.

For hearing-impaired learners a growth in computer use meant that digital text was becoming more central to communication. This was found to be enabling for hearing-impaired learners, as one teacher reported:

“And so the historic notion of deafness being isolation and you've got no way of communicating with people – that's all breaking down, so our expectations of people are rising all the time, and this is the same for the hearing-impaired students. Whereas before they'd go home and that would be it, you know there'd be very little contact with others. Now they're all on MSN constantly with each other; they all use mobile phones to text each other. So the communication is growing all the time and again that's just opening up their social network and improving their language all the time.”

One of the teachers conceptualised deafness as a minority language issue, rather than putting it in a 'disabled' category, and had ensured that the teaching of hearing-impaired learners was integrated with that of hearing learners. Laptops were used for electronic note-taking but were becoming much more normal across the school so that students no longer felt stigmatised or different when using them. Specialised teaching assistants did note-taking in class for students since hearing-impaired learners could not lip-read and write notes at the same time. This required the teaching assistants to have touch-typing skills, which not all of them had. Further integration into school-wide systems was also required to ensure that learners' work was always printed out and passed to the teacher for feedback, or alternatively sent by email, a method which more teachers were reported as using. Computers also had the capacity for British Sign Language. Academic achievement for this hearing-impaired group had improved since this teacher's arrival, so that for the first time there would be at least four hearing-impaired students in the next year's sixth form, taking a range of subjects including physics, psychology, general studies, BTEC business and media studies.

At a secondary school a disability steering group had been set up to assess the curriculum and classroom practices in terms of accessibility for learners with disabilities. The group comprised both teachers and learners. In one instance a learner suggested that students with different learning needs could assess teaching and learning materials and approaches, which included the use of certain technologies. One teacher explained:

"I think... getting students to be involved in setting differentiation is actually great... That was an idea by a student... he said... what about if we look at what you're doing because we're the ones who use it. We can tell you what works well for us, and we were like, 'Wow, fantastic! What a great idea!' So that's going down the line of being more student-led, which I think is where we want to go more."

At this school learners with special educational needs are encouraged to take control of their learning by using techniques and technologies that work for them.

"They then have to put in the effort to make that decision, and I do encourage them to take control."

5.3.2 Difficulties and challenges were noted in the provision of personalising learning opportunities for some groups of learners

Our findings showed that institutions often find it challenging to provide opportunities for personalising of learning for some groups of learners. For example, learners on the autistic spectrum at one of the schools found it difficult to process ideas and information, and as a result couldn't be given total freedom to choose activities or ways of presenting their work. This resulted in class teachers refining the choices

available, based on their perceptions of learners' preferences. Limited literacy skills also restricted access to computer programs and software for some learners. Others, who for example cannot spell their names, had problems logging in, and the poor motor skills of some learners made the use of DTs, for example the process of clicking and dragging, difficult.

At one of the schools with special educational needs provision a teacher commented on how he used an Excel spreadsheet to make a note of the skills learners have acquired in a lesson. He then referred to the information when planning follow-up lessons, enabling him to determine the best pace of learning for particular topics and groups of learners.

A group of gifted and talented learners at one school was encouraged to use DTs in the multimedia room to design and write the school brochure. Although this example illustrates how technology can be used to address the needs of learners with special educational needs, it was acknowledged that the most advantaged learners are those whose teachers possess good digital technology skills, have an interest in technology, and allow their students to be actively involved. In particular, the deputy headteacher at one school thought that learning platforms suit the more 'able' learners since these learners typically have more independent learning skills and tend to be slightly more organised. However, he also acknowledged that weaker learners benefit from the system because they have the opportunity to revisit work covered during lesson time.

5.4 The use of DTs to address non-pedagogical concerns

5.4.1 Use of DTs can enhance personalising of learning by providing learners and teachers with opportunities to focus together on reviewing records of progress, as well as planning

One of the case-study institutions had recently implemented a personal online tutoring system. The development of this integrated electronic reporting and tracking system initiated a shift from group tutorials to personalised support.

Learner records are available through the learning platform, which provides a mix of teaching and assessment resources such as handouts, tests, previous attainment records, ongoing average grades and benchmarks, ongoing attendance data for each learner, details of the courses attended by each learner, and learners' timetables. All of this information is accessible through a personal log-in both in and out of school. The staff section provides alerts about at-risk learners, for example international learners, learners recently moved into the area, re-enrolled learners, early leavers/repeating-year learners, and additional support needs. The alert also highlights concerns over attendance/punctuality, disability, exams, personal/family circumstances and health.

The wealth of data held on the system about each learner, and the fact that the system is used across the institution, enabled the tutoring system to be implemented. Online tutoring involves learners having personalised, individual weekly discussions with their tutors about their progress across all subjects, and there is a section on issues arising. Technology played an important role in the system because the online records allowed the personal tutor and the learners to have an overview of progress and issues. The best aspects of the system were outlined by a teacher:

“The one-one point was when we could do it all online, ILT has absolutely allowed us to really personalise it. The tutor can sit down with a student, look at their attendance, what work they’ve done, how they’re doing in that subject, the support needs that they have. That’s really had a big impact on us. “

The shift to a personal tutor system was welcomed by most learners; however, relationships with staff came up as an important related element. Both learners and staff stressed that an ethos of non-hierarchical or less hierarchical supportive relationships seems to be a key factor for the personalising of learning activities. As one of the learners commented:

“If you’ve got concerns or anything like that, it makes it easier to talk to them [the teachers] because they don’t seem like someone up there; it makes them more approachable. “

5.4.2 DTs and learner assessment

At another of the case-study schools, hands-on digital technology was used for learner assessments in ways that gave learners more control over the content of subsequent lessons. Teachers received instantaneous feedback on activities and tasks completed by the learners. For example, Promethean’s Activote pads were linked to an Activboard interactive whiteboard to assess children’s maths skills. Learners considered that this approach made routine testing more exciting, while the teacher is given instant information about where support is needed (Fies and Marshall, 2006).

However, the literature on formative assessment (eg Black *et al.*, 2003) suggests that, if we are serious about establishing long-term capacity to learn, technology may be better employed to strengthen assessment for learning rather than to make testing more exciting. This comment reflects the dangers of seeing school as a place where performance is assessed through competitive, marked activities (Dweck, 2000).

5.4.3 The use of DTs in behaviour-management strategies may exclude certain learners

There was some evidence of DTs being used within the wider framework of behaviour management and their use being indirectly influenced by learners' behaviour. Learners tended to differentiate between what they saw as useful or important uses of computers, for example for completing homework, and not useful/unimportant uses of computers, for example playing games. This perception was reinforced in schools where staff used playing games on a computer as a form of reward (Becker, 2000).

“We've got the Nintendo Wii as well, which is fantastic... we use that for a treat sometimes.”

When DTs, for example laptops and games computers such as Nintendo Wii, are used as rewards for good behaviour or for completing work, this may exclude or partially exclude the learners who do not meet the criteria (Singleton and Simmons, 2001).

5.5 Measuring the impact of using DTs

In many cases it was difficult to measure the impact of using DTs. Staff ultimately want to increase academic standards, however in many cases the reasons for introducing various technologies are to increase learners' interest in, and engagement with, learning. From examples given in this report it can be seen that the use of DTs tended to achieve this aim, with staff and learners commenting on how learning was more enjoyable, and referring to increased confidence and motivation when DTs are used.

Some institutions reported specific improvements in attainment and value-added measures but since it was not possible for the research team to attribute this confidently to the personalising of learning through DTs, no specific reporting of these data is included.

Although some of the institutions researched had taken measures to assess the impact of using various DTs to personalise learning, for example through the use of questionnaires and through 'e-leaders' feeding back to staff about the usefulness of technologies, there were few formal attempts to measure impact.

Conclusions and recommendations

6.1 Conclusions

Overall, the 10 case studies provide illuminative evidence of what is possible and what might be further developed, although it needs to be acknowledged that the institutions were selected partly because of their relatively advanced work in the use of DTs to support personalising of learning.

The key findings are summarised as follows:

- 6.1.1 A wide range of DTs are used in some institutions for supporting learner-influenced personalising of learning. This includes supporting very young learners and those with identified special educational needs.
- 6.1.2 In general, the primary and special schools (only one special school and one unit) showed slightly more innovative practice. This seems to be a reflection of the greater organisational constraints in secondary schools and colleges, such as the departmental structures and assessment requirements. There may be an assumption that when learning is personalised, this is automatically good. However, the wider frameworks of curriculum and assessment may constrict the degree and/or level of personalised learning it is possible to achieve.
- 6.1.3 Genuine learner-led personalised learning using DTs was relatively rare in the 10 case-study institutions researched, although this report identified some activities that meet the criteria and may be of wider interest. More usually, activities were suggested, set up or initiated by staff, who then tried to give learners more responsibility for making decisions about further developments within these activities. Hence we have adopted the term 'learner-influenced' to distinguish these activities from those that may be deemed genuinely 'learner led'. Pedagogical and cultural changes are needed to support development from encouraging learners to make choices (learner-influenced activities) to giving learners greater control (learner-led activities).
- 6.1.4 Institutions in which learner-led and learner-influenced personalised learning occurred through the use of DTs were characterised by staff who were receptive to the idea, management support for staff taking risks, technical support that addressed problems, acknowledgement of learners' skills and confidence in the use of DTs, and some established work on learner voice.
- 6.1.5 Many of the benefits reported by institutions, such as higher expectations and motivation and, in a few cases, improvements in attainment or value added, are difficult to attribute confidently to initiatives identified by the fieldwork. Nevertheless, there was some evidence from triangulated sources of data that suggested learner-influenced personalised learning snowballed. DTs

contributed to this process through increasing motivation, collaboration and participation, and increasing support for inclusion of learners with specific identified needs.

- 6.1.6 Levels of technology competence of both staff and learners could enhance or limit the capacity of DTs to support learner-led personalising of learning. Learners need to be confident in the use of technology to take more control over their learning, and teachers need to be confident enough to give the learners that control and to be willing to learn from them.
- 6.1.7 The use of multiple sources of data for tracking and targeting learners is in some ways positive, but the capturing of this data and the duration it is held raises concerns about data protection and freedom of information. Also, monitoring of records of learners' use of learning platforms raises potential privacy issues because staff and parents can look at every interaction learners make.
- 6.1.8 The use of DTs to support personalising of learning encouraged greater inclusion by allowing learners with special educational needs to work more independently from support teachers. The use of technology also reduced the embarrassment of some learners at feeling different and stigmatised, by increasing their participation and learning capacity.
- 6.1.9 Learners tend to have a clear idea of what improves their learning and social opportunities, and this to some extent mirrors their views about appropriate uses of digital technology in the home when compared with uses in school or college. This suggests that while continuing to develop greater parity of access to DTs outside school or college, the use in school or college should acknowledge and build on, but not try to match, use outside.
- 6.1.10 Internet regulation was reported to be inconsistent across institutions, local authorities and, predictably, learners' homes. There was an acknowledgment of the tension between the need to safeguard learners on the one hand, and to develop life skills for self-monitoring and regulation on the other. It was mainly older learners who complained that their school or college work was restricted when websites were blocked.

6.2 Recommendations and policy implications

- 6.2.1 Examples of learner-led and learner-influenced personalising of learning supported and enhanced by DTs should be made available more widely through websites, conferences and in National Strategies material. Practitioners are more receptive to descriptions and still and moving images which demonstrate how other practitioners have approached this challenge.

- 6.2.2 It should be made explicit, for example through staff-development materials and in-service training, that very young learners and learners with a range of special educational needs can use DTs effectively and take greater responsibility for their learning. These skills and understanding should be better acknowledged and built upon.
- 6.2.3 Notwithstanding concerns about safeguarding learners and the potential of mobile devices to distract learners from teaching and learning, resources to which learners have regular access could be used more extensively for the personalising of learning.
- 6.2.4 Some institutions create more flexible opportunities for learner-led personalising of learning while at the same time successfully meeting curricular and assessment requirements. Ways in which they do this should be subject to further discussion and analysis. Potential constraints could be addressed at the same time as current modifications in 14–19 provision.
- 6.2.5 The Byron report recommends that a more consistent approach should be adopted for internet availability and access. All schools and children's services should use filtering software as recommended in the Byron report. Becta's self-review framework assessment, incorporating e-safety, should provide the basis for schools' internet access regulation, which should be reflected in each school's acceptable use policy. Through consideration of the viability, risks and practicalities, a strong emphasis should be placed on equipping learners with the confidence and skills needed to enable them to navigate the internet safely. Underwood *et al.* (2008) note the need to see learners in this context as 'discerning consumers not naive victims', and this is strongly endorsed in Byron's references to the need to support children's resilience.
- 6.2.6 Sustainability is still too dependent on specific teachers, which suggests that there is a need to look at the processes used by institutions to embed personalising of learning. Developing a culture in which these activities are learner led moves away from a dependency on one teacher.
- 6.2.7 Ongoing work with Ofsted and other national agencies will be necessary to ensure that a shared vision for learner-influenced personalising of learning is developed and communicated to schools and colleges.
- 6.2.8 If different DTs are used for different types of learning outside and inside school (also reported by Underwood *et al.*, 2008), there are implications for the recommendations made by the Home Access Taskforce. This may be further complicated by factors which restrict access, such as socio-economic circumstances and students with special educational needs.

6.3 Outstanding issues

- 6.3.1 Where learners are leading activities to personalise their learning through the use of DTs further investigation is needed to determine which learners are leading this.
- 6.3.2 Where there is evidence of learner-led personalised learning using DTs examples of ways in which such practices can be transferred to other institutions should be made available for others to learn from.
- 6.3.3 Institutions should be given guidance about how they can build on the skills and interests which learners have in DTs used outside school in order to develop aspects of their learning. For example, whatever the rules regarding mobile phones, mobile phones are now ubiquitous and most students carry one. Leaders should be encouraged to consider how they might use these potentially powerful technologies more effectively in schools and colleges.

Appendix 1 – Selecting the case-study institutions

An initial identification of institutions was done through contacts with existing fora such as the Specialist Schools and Academies Trust, the Department for Children, Schools and Families (DCSF), National Strategies, Training and Development Agency (TDA), Qualifications and Curriculum Authority (QCA), General Teaching Council (GTC), National College of School Leadership (NCSL), Children's Services Network and Becta, and through specific institutions who had heard about the project (often through the teacher organisations) self-referring. We checked school and college websites and made telephone calls to schools and colleges in an attempt to determine the extent to which they met the core criteria of showing evidence of learner-initiated practice in personalised learning through the use of DTs.

In several schools and colleges, the headteacher or senior member of staff we spoke to gave the impression that the institution met the core criteria. For example, staff at one school considered they were using DTs to personalise learning but, after further discussion, it became apparent that in reality this meant that learners were given a choice of whether to submit work electronically or in hand-written form. In some cases, schools claimed to personalise learning through the use of DTs, but lack of resources meant that this did not happen on a regular basis. In other cases, the lack of resources was in fact lack of maintenance or repair, which rendered resources unusable.

More often, the schools claimed that initiatives were learner led, but further questioning revealed that they had been initiated, set up or led by staff. We did not enter into negotiations with schools about this during the selection process, but refined the project criteria to include learner-influenced as well as learner-led initiatives. This reflected our developing view that the cultural changes required for schools to exhibit true learner-led activities often evolved through a stage in which learners influenced practices and organisation.

The following schools and colleges were also selected:

- Institutions in which the head or contact teacher in the school expressed an interest and willingness to be included
- Institutions in which learners expressed a willingness to be included. Letters were sent to learners informing them of the nature of the project. There were no instances of learners receiving letters and declining the offer.

We ensured a mix of institutions in terms of size, geographical location, socio-economic circumstances, urban/rural location, percentage of special educational needs learners, and percentage of ethnic minority learners.

Previously well-publicised institutions were avoided.

Appendix 2 – Methodology

The project ran from October 2007 to March 2008.

We carried out research in 10 case-study institutions, comprising four primary schools, three secondary schools, one sixth-form college and two schools with special educational needs provision. Of the schools with special educational needs provision, one was a secondary school for pupils with moderate learning difficulties, with a large percentage of learners on the autistic spectrum; the other was a hearing-impaired unit attached to a mainstream secondary school.

A major challenge for the project was to select suitable case-study institutions (see Appendix 1).

The case studies were conducted between October and December 2007. Within each of the case-study institutions, we analysed documentation, observed some relevant activities identified by the institutions and conducted in-depth interviews with a range of staff, some learners and, where possible, governors and parent governors. We were keen to speak to a broad range of staff to help us gain a clear picture of ways in which learning has been transformed through the learner-led or learner-influenced use of technology for personalising learning. We also wanted the staff and learners to describe specific examples of their involvement in this type of learning.

When interviewing learners from the schools and colleges, we included an activity called the Diamond 9 (O’Kane, 2000). This was aimed at exploring the kinds of technology learners thought were important in helping their learning. Learners were asked to look at nine cards with pictures of a range of technologies (mobile phone, digital camera, digital video camera, computer, networking website, PDA, games console, chat program, portable music player such as MP3 player) and to rank them in order of importance to their learning both in school and at home on the ‘diamond’ card. (See Appendix 3 for a glossary of terms relating to various technologies referred to in this report.) Although the cards mainly featured hardware, and one output was an overall ranking order, the main purpose of the activity was to encourage discussion among learners about how and when they used these technologies. Digital photos were taken of the finished results. The learner interviews and discussions which took place during and before and after the Diamond 9 activity were audio-recorded and partially transcribed. In most cases, one of the learners in the group or the researcher recorded the activity on video. The audio and video recordings allowed the research team to re-visit and closely analyse the discussions which took place during the activity. See Appendix 4 for further details of findings from this activity.

Methodological cautions

Within the case-study institutions, it was common for the headteacher or other senior member of staff to identify the interviewees. Thus the findings reported are based on data from a limited number of selected staff and learners.

In order to maintain some consistency among learners in the group interviews, we invited participation from learners in Years 3 and 5 in primary schools and learners in Years 8 and 10 in secondary schools. Not all schools could accommodate our requests, and in some cases we spoke to learners in other year groups. We also suggested to the institutions that a mix of learners in terms of ability would be appropriate for this work. However, it appears that some of the learners involved were among the more able and articulate, or those more familiar with digital technology initiatives.

It is also important to acknowledge that our report relies significantly, though not exclusively, on the accounts of the teachers, other adults and learners interviewed. In all of the schools, we were able to interview each of these groups separately, thus gaining the specific viewpoint of each of these groups. These accounts were supplemented by direct observation of activities considered by the school or college to match the focus of this project, and, in some cases, by documentation. Examples of additional practice relating to the ways learners and their representatives have used technology to help personalise learning were described to us through interviews, but we are aware that accounts can be problematic because they can tend towards idealism, although learners' perspectives sometimes mitigated this.

Appendix 3 – Glossary of terms

Activboard	A proprietary brand of <i>interactive whiteboard</i> produced by Promethean, a UK-based interactive learning technology company.
Activote	Interactive handheld device which allows voting or selection of options and the display of responses by pupils on an <i>interactive whiteboard</i> to encourage class participation. Sometimes also referred to as a voting pad, Activote is produced by Promethean. See also <i>Activboard</i> .
Assistive technologies	A range of software and hardware which support learners with particular needs.
Bebo	An example of a <i>social networking website</i> where individuals can set up pages with information about themselves and send online messages. See also <i>Facebook</i> .
Bluetooth	A file-exchange standard which uses short-range radio links to exchange information, enabling wireless connectivity between mobile phones, mobile PCs, handheld computers and other digital devices.
blog	Short for weblog. An online diary on a public web page which usually records an individual's perspectives.
chat program	Software such as <i>MSN</i> which lets people send each other messages quickly over the internet.
digital camera	A camera which captures still images in digital form so that they can be transferred and used by other <i>digital technologies</i> .
digital technologies	A wide range of technologies, most of which involve computers or microprocessors in one form or another. They enable the storage, retrieval and manipulation of all kinds of information in digital form (text, sound pictures and video). See also <i>ICT</i> .
digital video camera	A camera which records video images in digital form so that they can be transferred and used by other <i>digital technologies</i> .
DVD	Acronym for digital versatile disk or digital video disk. A disk which can store large quantities of digital information, particularly digital video.
e-learning	In the broadest sense, learning supported by <i>digital</i>

	<i>technologies</i> , often associated with the use of <i>learning platforms</i> , virtual learning environments (VLEs) or managed learning environments (MLEs), using computers and online resources. Commonly used to refer to the supporting technologies, rather than the pedagogy of learning with such technologies. See also <i>online learning</i> .
electronic reporting and tracking	A computer-based system for monitoring pupils' progress, which can either be automated and based on electronic or online assessments, or based on data entered manually, such as from teacher assessments.
e-strategy	Strategy or plan for the development and integration of digital technologies. In education, the term usually refers to the development of e-learning or the infrastructure to support this.
Excel	An example of a spreadsheet program, in this case produced by Microsoft, for managing and calculating with quantitative data.
Facebook	An example of a <i>social networking website</i> where individuals can set up pages with information about themselves and send online messages. See also <i>Bebo</i> .
filter	The settings in an internet-access control program which restrict or <i>filter</i> access to external websites and files.
Flash	A software program produced by the Macromedia for creating graphics and animations, particularly for websites. It uses vector graphics to produce animations and navigation that are of a higher quality than on standard web pages. The computer that runs the program requires a Flash plug-in or additional software.
games console	A computer designed specifically for playing games. Larger ones are plugged in to a television set to display the game. Smaller handheld consoles have their own screens.
ICT	Acronym for information and communications technology. ICT encompasses a variety of forms and is used here to describe all <i>digital technologies</i> for the management and exchange of information.
interactive whiteboard	Large touch-sensitive display for a computer, usually mounted on a wall so that it can be operated by

	touching the screen rather than with a keyboard and mouse.
iPod	Apple's brand name for a range of portable digital music players – in this case <i>MP3 players</i> .
iTunes	Apple's software for the management of music and sound files. It can store, organise and play music, and exchange these files with <i>MP3 players</i> .
learning platform	A general term which describes a broad range of <i>ICT</i> (qv) systems used to deliver and support learning and teaching. A learning platform usually combines several functions, such as organising, mapping and delivering curriculum activities, and the facility for learners and teachers to interact with such activities through <i>ICT</i> . It can refer to a virtual learning environment (VLE) or to the components of a managed learning environment (MLE). See also <i>e-learning</i> .
MP3 player	A small portable device, such as an <i>iPod</i> , which enables users to listen to digital music (most commonly through headphones).
MSN	An online <i>chat program</i> , Microsoft Messenger, which allows people to type messages to other people over the internet. It can also be used for sending files and video.
Nintendo DS	A handheld <i>games console</i> developed and manufactured by Nintendo. It has a clamshell design with two LCD screens inside – one of which is a touch screen.
Nintendo Wii	The Wii is the fifth home video <i>games console</i> released by Nintendo. A key feature of the console is its wireless controller, the Wii Remote, which can be used as a handheld pointing device and can detect movement and acceleration in three dimensions.
NUMU	A free, online safe space, dedicated to education, where students (and/or teachers) can upload audio files of the music they compose or perform, in or out of school. The work can then be listened to by anyone with internet access. Teacher or student members may also comment (or 'shout back') positive feedback.
online forum	An area of a website or <i>learning platform</i> where members can send typed messages and questions

	which others can see, read and respond to.
online learning	Learning supported by online resources or through a <i>learning platform</i> , a virtual learning environment (VLE) or managed learning environment (MLE). See also <i>e-learning</i> .
PDA's	An acronym for personal digital assistant – a term for any small mobile handheld device that provides computing and information storage and retrieval capabilities for personal or business use, often controlled using a stylus stored on the side of the device. 'Handheld' and ' <i>Pocket PC</i> ' are synonyms.
personal online tutoring system	Support and feedback provided in <i>learning platforms</i> (qv) or virtual learning environments (VLEs), which can either be automated, such as through online tests, or provided by human tutors using messaging systems.
Photoshop	Professional image-management and editing software produced by Adobe.
Plasma screen	A large flat screen for a computer, often used in a public area to display information and presentations. It contains inert ionised gas or plasma that enables the pictures to be created.
Pocket PC	A small, handheld personal computer about the size of a large mobile phone. Also called a <i>PDA</i> .
podcast	A sound file available on the internet (or a school network) for others to download and listen to on a computer or <i>MP3 player</i> . See also <i>iPod</i> .
PowerPoint	Presentation software produced by Microsoft.
Sketchy	Basic animation and drawing software for <i>PDA's</i> produced by GoKnow!
social networking website	A website, such as <i>Bebo</i> or <i>Facebook</i> , where members add and edit their own web pages, usually with information about themselves, and where they can chat online with other members or contacts.
Vista	A recent version of the Windows operating system for personal computers, produced by Microsoft.

What is e-learning?

There is no commonly accepted definition of e-learning. E-learning involves the use of DTs for learning, but ideas about the nature of the technology and its role in supporting learning vary widely. E-learning is usually distinguished from computer-based training through reference to aspects of networking and interaction beyond that which would be offered by a single computer (Cross, 2004).

E-learning is often seen as equivalent to online learning (Harasim, 2006) or equated with the use of learning platforms such as virtual or managed learning environments (VLEs and MLEs). Four broad dimensions can be identified in common usage; e-learning may constitute:

- a basic form of content-based management by a computer or computers, usually with the addition of some tutoring components
- distance education or similar forms of more formal open learning making use of technology
- any form of pedagogical model or instructional design that makes use of ICT
- learning supported by technology (with a distinction between e-learning, which emphasises the learner and the learning experience, and e-teaching or the management and delivery of a curriculum supported by technology).

The common underpinning in these distinctions is the use of networked DTs to support learning. Differences in definitions usually relate to a number of further dimensions, such as that the learning may:

- be formal or informal
- involve independent use or be supported either by a tutor or automated feedback
- be tightly structured or relatively unstructured
- occur synchronously (involving learners and tutors online together) or asynchronously (separately or sequentially)
- involve technology for all interaction, such as in online distance learning, or be part of a blended approach involving face-to-face communication as well as interaction supported by technology.

Schulmeister (2005) makes a further useful distinction – in terms of complexity of the learning goals – between e-learning based on relatively manageable content that can easily be made explicit through online tools and learning objects, and self-managed learning and e-learning, which requires more complex interaction based on implicit knowledge. The latter has to be acquired through interaction in a learning community or community of practice.

Appendix 4 – The Diamond 9 activity

Eighteen groups of learners participated in the Diamond 9 activity for the school interviews. The learners were drawn from four primary and three secondary schools, one special school and one unit for hearing-impaired learners which was attached to a mainstream school.

For the activity, learners were shown cards featuring digital technology items and asked to rank them according to how much they supported learning. The activity was designed to encourage learners to talk about their use of DTs, rather than provide a clear and comprehensive rank order based on hardware and applications. As such, nine sometimes quite broad technologies were selected for the activity (mobile phone, digital camera, digital video camera, computer, networking website, PDA, games console, chat program, portable music player such as MP3 player).

The Diamond 9 activity encourages learners to clearly identify the highest and lowest priorities. However, the cards between these are grouped in twos or threes to prevent learners spending too long deciding the exact positions of those cards.

Below is an example of a completed Diamond 9 activity from one case-study school.



Methodological cautions in using the Diamond 9 activity

It is important to acknowledge the dangers of over-simplistic analysis of these data.

Discussion by all groups, including the youngest learners (Year 3), demonstrated pupils' awareness and experience of most of the technologies and an understanding of how they could enhance their learning. However, the extent to which all learners were familiar with, and understood the capabilities of, the technologies they were asked to rank is less clear. Indeed, the fact that a small number of primary groups interpreted 'networking websites' simply as websites led to a higher ranking than was expected. Some issues emerged from the wider interview; for example, special school learners had a more limited understanding of social networking sites.

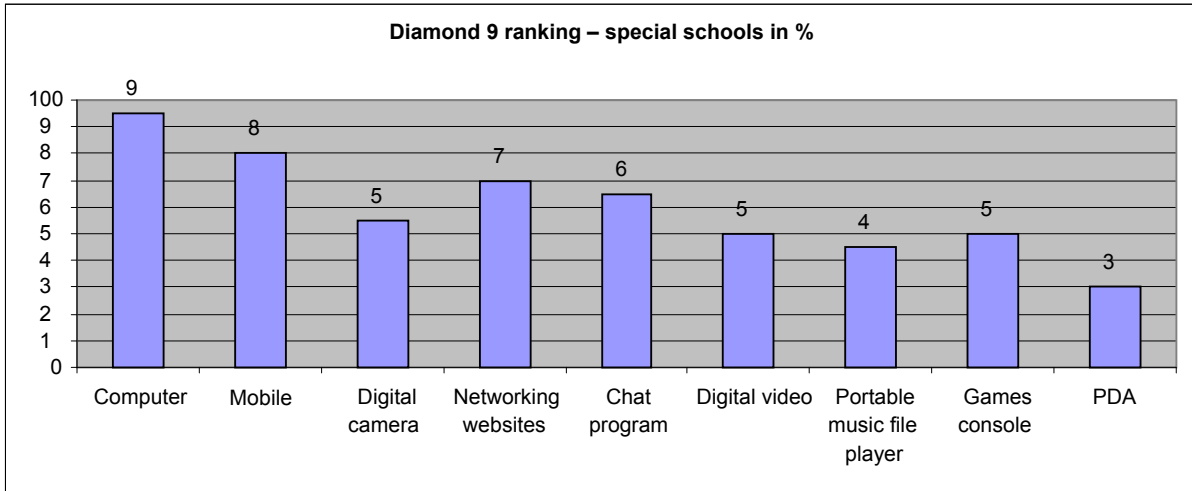
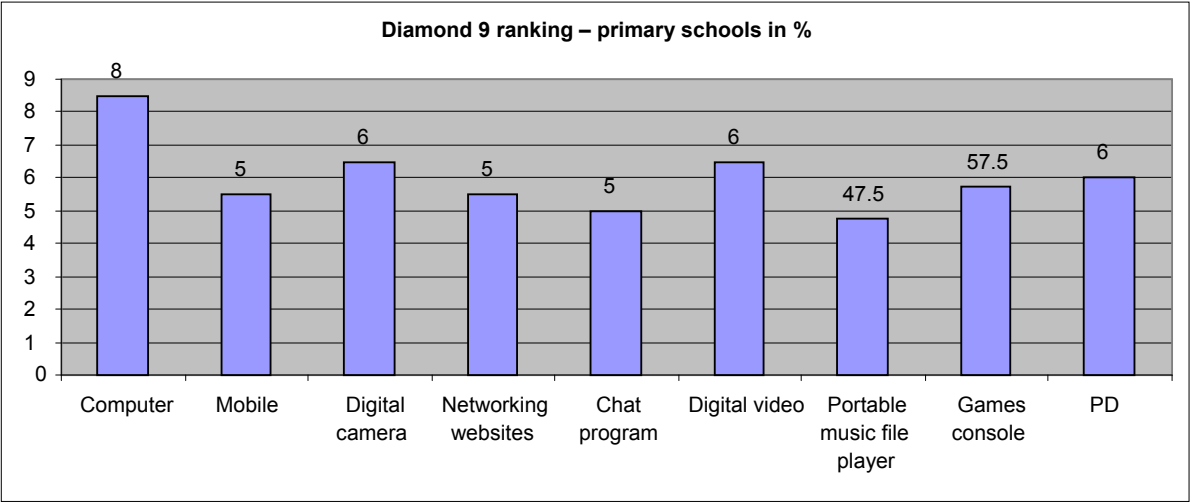
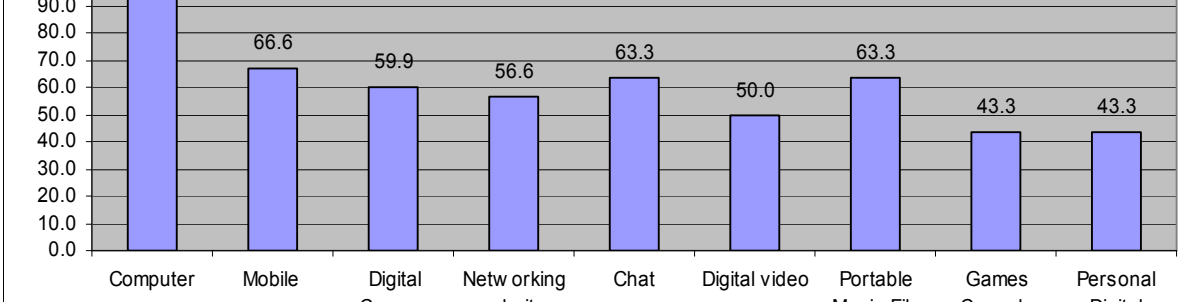
In addition, some technologies have the potential to be used in a variety of ways. For example, as well as mobile phones being used for text messages and phone calls, some can also be used for taking photographs and video, recording audio, surfing the internet and sending emails. Separate pictures of digital cameras and camcorders were included in the Diamond 9 activity because the researchers considered them to be more representative of the types of technologies used in schools.

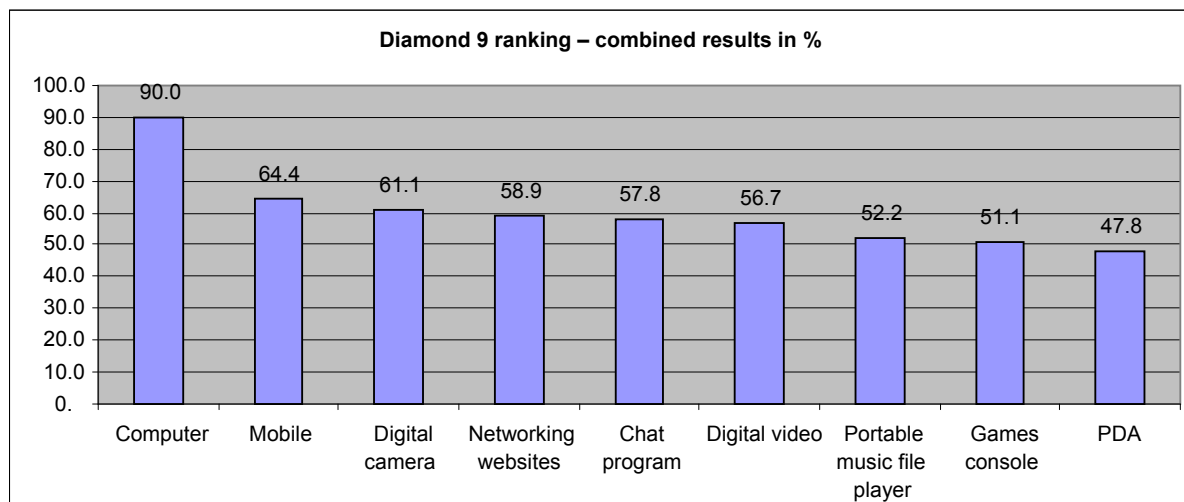
It is also possible that some learners ranked functions (eg use of the internet and email) while others ranked equipment (eg computers). Other types of technology mentioned in the interviews included USB drives, webcams, and voting or response systems for use with podcasts, but these were not included as specific cards in the Diamond 9 activity.

Regardless of these reservations, the activity provided a valuable means of grounding the interview questions, so helping to maximise participation from most of the learners involved. It was interesting to note that when discussing which technologies helped with their learning, learners frequently did not appear to divide their learning into in-school and out-of-school learning.

Findings from the Diamond 9 activity

The overall results from the Diamond 9 activity are set out below.





The findings show that computers were ranked as the most popular of the nine technologies which helped learning. However, the margin of difference between computers and the other eight technologies is comparatively small (see graphs above). Learners in Key Stages 3 and 4 in particular use what may be termed ‘social’ technologies (eg instant messaging, social networking, mobile phones and games) and view these as extremely important in their social lives, not only as part of their identities, but also central to their learning. As one Year-10 learner commented:

“In IT we were using our phones the other day – just the camera as I can transfer pictures from my phone to my laptop – and... another class had the cameras that day and we needed to take photos, so we had phones out for videoing and pictures. And then in science we were using [them] as a timer because [the school had] run out of stop watches...”

Three of the top-five ranked technologies included mobile phones, chat programs and networking sites. One sixth-form college contacted students via their mobile phones, and while one school did appear to have a more relaxed approach to the use of mobile phones (see above), these technologies were most commonly reported by learners to be restricted or in some cases banned at school. Consideration needs to be given to the ways in which institutions can be encouraged to use potentially powerful technologies more effectively to develop learning.

A recent study by Underwood *et al.* (2008) also used card sorts to determine the popularity and frequency of use of the technologies that children use at home and/or at school across Key Stages 1–4. Direct comparisons between this study and our own are difficult because Underwood *et al.* began with a larger number of specific DTs, and each project used a different type of card-sort activity. However, the overall findings suggest that the results from our Diamond 9 activity support the findings of Underwood *et al.* about the types of DTs used by learners. Because our activity focused on how these technologies supported learning, there are some differences between the findings. For example, at Key Stage 2, digital cameras and camcorders

were ranked higher than in the study by Underwood *et al.*, while games consoles were ranked lower. This is not surprising because cameras are more likely than games consoles to be used to support learning in school, rather than out, at this key stage.

In addition, PDAs were ranked fourth in our study at Key Stage 2. This may well be because a number of our case-study schools used these more than was anticipated, and one of the schools was involved in a pilot project using PDAs.

At Key Stage 3, the results are similar to findings from Underwood *et al.* (2008), with digital cameras, camcorders and mobile phones being ranked higher in our study, while games consoles are ranked lower. Instant messaging is ranked third, supporting the findings of Underwood *et al.* about its popularity with learners of this age.

Appendix 5 – Aspects of practice that might be transferable

Many of the practices using DTs to personalise learning that have been mentioned in this report could be transferred for use in other institutions. These include:

- the use of PDAs at home and school
- learning walks – staff and/or learners visit another institution to look at an aspect of the institution that interests them, for example how DTs are being used; subsequent discussions focus on how those from the visiting institution can implement the practices they have seen
- learners as e-technicians – learner assist others with technical problems with laptops
- learners as e-leaders – learners consult other learners on their views about the e-learning system, and then pass the information to teachers and the school management team
- learner-to-learner teaching about the use of DTs
- learners writing content for online courses, which can be accessed by other learners
- involving learners in using DTs to produce a school brochure
- use of technology to encourage peer- and self-assessment of learners' work
- learning platforms used in ways that enable learners to take greater control of their learning. For example, with so many learners having MP3 or portable music file players, the use of podcasts or audio recordings hosted on the school learning platform would allow learners to decide whether they want to download these resources to support their learning.

Our previous research on the transfer of practice (Fielding *et al.*, 2005) suggests that practice is transferred most effectively when built upon current relationships. This study found that acquiring learning about new practices was more successful when it was perceived as co-learning, rather than a simple notion of transfer from one expert individual or institution to a novice.

References

Ainscow, M. (2006), 'Responding to the Challenge of Learner Diversity: A briefing paper for the Teaching and Learning in 2020 Review', University of Manchester Faculty of Education.

Attewell, J. (2004), 'Mobile Technologies and Learning: A technology update and m-learning project summary', London: LSDA. Available from <http://www.m-learning.org/docs/The%20m-learning%20project%20-%20technology%20update%20and%20project%20summary.pdf>

Baumfield, V.M., Butterworth, M. and Edwards, G. (2005), 'The impact of the implementation of thinking skills programmes and approaches on teachers', in *Research Evidence in Education Library*, London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Black, P., Harrison, C., Lee, C., Marshall, B. and Wiliam, D. (2003), *Assessment for Learning: Putting it into practice*, OUP.

Cross, J. (2004), 'An informal history of e-learning', *On the Horizon* **12**(3), 103–110.

Dweck, C.S. (2000), *Self Theories: Their Role in Motivation, Personality, and Development*. Lillington, NC: Taylor and Francis.

Fielding, M. (2004), "'New wave" student voice and the renewal of civic society', *London Review of Education* **2**, 197–217.

Fielding, M., Bragg, S., Craig, J., Cunningham, I., Eraut, M., Gillinson, S., Horne, M., Robinson, C. and Thorp, J. (2005), 'Factors Influencing the Transfer of Good Practice', DfES, Research Report 615.

Fies, C. and Marshall, J. (2006), 'Classroom response systems: A review of the literature', *Journal of Science Education and Technology* **15**(1), 101–109.

Granger, C.A., Morbey, M.L., Lotherington, H., Owston, R.D. and Wideman, H.H. (2002), 'Factors contributing to teachers' successful implementation of IT', *Journal of Computer Assisted Learning* **18**(4), 480–488.

Harasim, L. (2006), 'A history of e-learning: Shift happened', in Weiss, J., Nolan, J., Hunsinger, J. and Trifonas, P. (eds), *The International Handbook of Virtual Learning Environments*, Dordrecht: Kluwer Academic Publishers, p 52.

Higgins, S. (2003), 'Does ICT make mathematics teaching more effective?' in Thompson, I. (ed), *Enhancing Primary Mathematics Teaching*, Buckingham: Open University Press.

ITSS (2007), '24/7 Learning M-technology: Final Evaluation October 2007', Durham: Durham County Council.

Kent, N. and Facer, K. (2004), 'Different worlds? A comparison of young people's home and school ICT use', *Journal of Computer Assisted Learning* **20**(6) 440–455.

McFarlane, A., Roche, N. and Triggs, P. (2007), 'Mobile Learning: Research Findings', Coventry: Becta. Available from: http://partners.becta.org.uk/upload-dir/downloads/page_documents/research/mobile_learning_july07.pdf (viewed 4 February 2008).

Miliband, D. (2004), 'Personalised Learning: Building a New Relationship with Schools', North of England Education Conference, Belfast, London: DfES.

O'Kane, C. (2000), 'The development of participatory techniques: Facilitating children's views about the decisions which affect them', in Christensen, P. and James, A. (eds), *Research with Children: Perspectives and Practices*, London: Falmer Press.

Sandvig, C. (2003), 'Public Internet access for young children in the inner city: Evidence to inform access subsidy and content regulation', *The Information Society* **19**(2), 171–183.

Schulmeister, R. (2005), 'Kriterien didaktischer Qualität im E-Learning zur Sicherung der Akzeptanz und Nachhaltigkeit', in Euler, D. and Seufert, S. (eds), *E-Learning in Hochschulen und Bildungszentren*, Munich: Oldenbourg, p 487.

Sebba J., Brown, N., Stewart, S., Galton, M. and James, M. (2007), 'An Investigation of Personalised Learning Approaches used by Schools', Nottingham: DfES Publications.

Singleton, C. and Simmons, F. (2001), 'An evaluation of Wordshark in the classroom', *British Journal of Educational Technology* **32**(3), 317–330.

Teaching and Learning in 2020 Review Group (2006), '2020 Vision: Report of the Teaching and Learning in 2020 Review Group', Nottingham: DfES Publications.

Underwood, J., Baguley, T., Banyard, P., Farrington-Flint, L. and Selwood, I. (2007), 'Impact 2007: Personalising Learning with Technology', Coventry: Becta.

Underwood, J., Baguley, T., Banyard, P., Dillon, G., Farrington-Flint, L., Hayes, M., Hick, P., Le Geyt, G., Murphy, J., Selwood, I. and Wright, M. (2008), 'Personalising Learning', Coventry: Becta.

Williams, D., Coles, L., Wilson, K., Richardson, A. and Tuson, J. (2000),

'Teachers and ICT: Current use and future needs', *British Journal of Educational Technology* **31**(4), 307–320.

Windschilt, M. and Sahl, K. (2002), 'Tracing teachers' use of technology in a laptop computer school: the interplay of teacher beliefs, social dynamics, and institutional culture', *American Educational Research Journal* **38**, 165–205.

Website references

NUMU <http://www.numu.org.uk>

Radiowaves <http://www.radiowaves.co.uk>