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innovation in education

Digital literacy across the curriculum

a Futurelab handbook

KEY TO THEMES OVERLEAF

Key to themes

Futurelab understands that you may have specific areas of interest and so, in order to help you to determine the relevance of each project or publication to you, we have developed a series of themes (illustrated by icons). These themes are not intended to cover every aspect of innovation and education and, as such, you should not base your decision on whether or not to read this publication on the themes alone. The themes that relate to this publication appear on the front cover, overleaf, but a key to all of the current themes that we are using can be found below:

Digital Inclusion – How the design and use of digital technologies can promote educational equality

Teachers and Innovations Innovative practices and resources that enhance learning and teaching

Learning Spaces – Creating transformed physical and virtual environments

Mobile Learning – Learning on the move, with or without handheld technology

Learner Voice – Listening and acting upon the voices of learners

Games and Learning – Using games for learning, with or without gaming technology

Informal Learning – Learning that occurs when, how and where the learner chooses, supported by digital technologies

Learning in Families – Children, parents and the extended family learning with and from one another

For more information on our themes please go to **www.futurelab.org.uk/themes**

This handbook and accompanying case studies are available to download free of charge from **www.futurelab.org.uk/projects/digital-participation.**

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Futurelab 2010

1. INTRODUCTION

Digital literacy is an important entitlement for all young people in an increasingly digital culture. It furnishes children and young people with the skills, knowledge and understanding that will help them to take a full and active part in social, cultural, economic, civic and intellectual life now and in the future.

To be digitally literate is to have access to a broad range of practices and cultural resources that you are able to apply to digital tools. It is the ability to make and share meaning in different modes and formats; to create, collaborate and communicate effectively and to understand how and when digital technologies can best be used to support these processes.

Digital literacy involves critically engaging with technology and developing a social awareness of how a number of factors including commercial agendas and cultural understandings can shape the ways in which technology is used to convey information and meaning.

It means being able to communicate and represent knowledge in different contexts and to different audiences (for example, in visual, audio or textual modes). This involves finding and selecting relevant information, critically evaluating and re-contextualising knowledge and is underpinned by an understanding of the cultural and social contexts in which this takes place.

Digital literacy gives young people the ability to take advantage of the wealth of new and emerging opportunities associated with digital technologies whilst also remaining alert to the various challenges technology can present. In short, digital literacy is the 'savvyness' that allows young people to participate meaningfully and safely as digital technology becomes ever more pervasive in society.

Schools are increasingly encouraged to embed the use of ICT in all subject areas across both the primary and secondary curricula. Considering how digital literacy supports subject knowledge can help to ensure that technology-use enhances teaching and learning rather than simply becoming an 'add-on.'

Indeed, if formal education seeks to prepare young people to make sense of the world and to thrive socially, intellectually and economically, then it cannot afford to ignore the social and cultural practices of digital literacy that enable people to make the most of their multiple interactions with digital technology and media.

Yet the notion of digital literacy and how it may translate to teaching and learning is not always well understood. This handbook therefore aims to support teachers to begin to think about how to address digital literacy in their everyday practice. It explores the importance of digital literacy and sets out some pedagogical techniques for fostering it in the classroom from within subject teaching.

1.1 ABOUT THIS HANDBOOK

This handbook is aimed at educational practitioners and school leaders in both primary and secondary schools who are interested in creative and critical uses of technology in the classroom.

Although there is increasing policy and research attention paid to issues related to digital literacy, there is still relatively little information about how to put this into practice in the classroom. There is even less guidance on how teachers might combine a commitment to digital literacy with the needs of their own subject teaching. How can digital literacy be fostered, for example, in a maths or science lesson?

This handbook aims to introduce educational practitioners to the concepts and contexts of digital literacy and to support them in developing their own practice aimed at fostering the components of digital literacy in classroom subject teaching and in real school settings.

The handbook is not a comprehensive 'how-to' guide; it provides instead a rationale, some possible strategies and some practical examples for schools to draw on. The first section details the reasons teachers should be interested in digital literacy and how it is relevant to their subject teaching. It looks at the increasing role of technology in young people's cultures, the support they may need to benefit from their engagement with technology and the way in which digital literacy can contribute to the development of subject knowledge. The second section discusses digital literacy in practice and moves through a number of components of digital literacy discussing how these might be fostered in the classroom.

The handbook ends by looking at issues related to continuing professional development for teachers and the ways in which digital literacy can support whole-school initiatives.

It is teachers that are expert in their own school context, in the needs of their students and in the pedagogical techniques required to support learning. This handbook has been informed by the work of fourteen teachers who are interested in how technology is used in classroom teaching and who took part in Futurelab's digital participation project. Rather than being prescriptive, it aims to provide information which will help teachers to make the best use of their own expertise to support students' emerging digital literacy.

1.2 THE DIGITAL PARTICIPATION PROJECT

This handbook is a result of a years' research project in which Futurelab researchers worked with eight primary school and six secondary school teachers in order to co-develop approaches to fostering digital literacy in the classroom.

The project was informed by a review of the research literature[1] in the field and meetings with a number of academics and researchers known for their work on media, information and digital literacies[2].

The teachers involved in the project worked with researchers and other teachers to explore the concept of digital literacy and its relation to subject learning and to think about how they might foster their students' digital literacy from within work already planned and scheduled for a particular half term. They planned teaching activities aimed at developing digital literacy alongside subject knowledge and trialed these activities in their own classrooms.

Where possible, this handbook draws on the research in order to provide practical examples to support the guidance. In addition, a set of digital literacy case studies are published alongside this handbook, which set out the classroom activities teachers undertook in greater detail.

1. Hague, C and Williamson, B (2009). Digital Participation, Digital Literacy and School Subjects: A review of the policies, literature and evidence. Bristol: Futurelab. Available online: **www.futurelab.org.uk/resources/documents/lit_reviews/DigitalParticipation.pdf**

2. Thanks is therefore due to Guy Merchant, Julia Davies, Andrew Burn, John Potter, David Buckingham, Cary Bazalgette, Josie Fraser, Martin Waller and Tabetha Newman

2. THE IMPORTANCE OF DIGITAL LITERACY

Why is digital literacy important and why should teachers develop digital literacy from within their subject teaching?

This section begins by discussing the expanding role of digital technology and media in society and in young people's cultures. It looks at the importance of supporting all young people to effectively engage with the possibilities that technology offers as well as the way it can affect their lives.

We then move on to discuss how digital literacy can support the development of subject knowledge in the context of a society in which information and meaning are increasingly created and communicated through technologies such as the internet.

2.1 DIGITAL CULTURES

Over the past decade digital technologies have become embedded in popular culture. Mobile phones are widely used by young people and adults alike. Websites such as YouTube and Wikipedia are the first port of call for many people seeking information about a chosen area of interest. TV, films and music are stored and accessed on computers, MP3 players and online. Email allows instant communication between people across the world. Online shopping and banking have become more prevalent and government services have become increasingly internet-based. Both online and offline gaming feature prominently in many people's lives and Web 2.0 technologies such as social networking sites allow people to collaborate by sharing and editing online content.

Although we cannot and should not overlook the inequalities that still exist in access to digital technology and the internet[3], it can be said that digital media is now a central aspect of most people's lives, whatever their age. The skills, knowledge and understanding of digital literacy are therefore becoming indispensible as young people grow up in a society in which digital technology and media play an ever more important role.

Young people's digital cultures

Just as technology is playing an increasing role in culture generally, so too does it play a growing role in the lives of children. Children and young people are engaging with digital media and using a wide variety of technologies at younger and younger ages[4]. They are likely to be watching TV and films and listening to music online and offline, playing computer games, creating MySpace or Facebook pages or, for younger children, taking part in Club Penguin[5]. Some children may also be creating, editing and sharing their own cartoons, animations, films, music or other media.

Children and young people, then, are actively manipulating digital media to participate in social and cultural life outside of school and making and sharing media has become increasingly important in the way that young people communicate with each other[6]. This means that children need to be able to negotiate information in multiple modes (textual, visual, audio and so on) and need to learn how meaning can be represented in those modes[7].

3. In 2009, a quarter of households in Britain had never had access to the internet. For more information internet use in Britain see Dutton, WH, Helsper, EJ and Gerner, MM (2009). The Internet in Britain 2009. Oxford Internet Institute, University of Oxford.

4. See, for example, Evans, J (ed) (2004). Literacy Moves On: Using popular culture, new technologies and critical literacy in the primary classroom. London: David Fulton Publishers.

5. Club Penguin is a virtual world for children of 6-14 years old owned by Walt Disney Corporation.

6. Wiegel, M, James, C and Gardner, H (2009). Learning: Peering backward and looking forward in the digital era. IJLM 1,1

7. Gunther Kress, for example, argues that texts are becoming increasingly multimodal and screens are coming to replace books and the page as dominant media. See, for example, Kress, G (2004). Reading images: Multimodality, representation and new media. Conference Presentation. **www.knowledgepresentation.org/BuildingTheFuture/Kress2/Kress2.html**

It also means that many young people are participating in multiple, distributed online networks and need to learn how to negotiate and manage their participation in these networks. Digital technologies, including the rise of social networking sites and online gaming, have made it easier for young people to be simultaneously connected to groups of their friends, peers and others who may be widely interspersed in geographical space. Digital literacy facilitates processes of interaction and participation and allows students to become active rather than passive in inter-personal contexts.[8]

In addition, some young people are using technology to design and author their own media. They may, for example, be creating a MySpace page or producing and editing music and film and sharing it online. Many young people may also be regularly sending each other video clips from YouTube, for example, or cartoons and photos they have found on the internet. Their aim may solely be to make their friends laugh or it may be more complex and ambiguous. In either case they are using digital technologies to communicate and therefore to create and share meaning in multiple formats.

> "We can't put the genie back in the bottle. Young people today expect to be able to appropriate and circulate media for their own self-expression." [9]

Digital literacy supports this process of young people becoming active meaning-makers.[10] Rather than preventing young people from engaging creatively with technology, a focus on digital literacy in the classroom can help them to expand and extend their use of technology for creativity and self-expression and to develop a greater understanding of the complexities of what they're doing.

There is, after all, much to be excited about in terms of the possibilities that digital technologies offer for children's self-expression, creativity and learning. Technologies such as the internet can offer extensive opportunities for informal learning and for expanding where, how, what and with whom children learn.

Education systems need to help young people to understand and benefit from their engagement with digital technology and digital cultures. Fostering digital literacy in the classroom provides one way in which to make subject learning relevant to a society in which growing technology use is changing the way that both adults and children represent and communicate information and meaning and participate in cultural life.

8. Davies, J and Merchant, G (2009). Web 2.0 for schools: Learning and social participation. New York: Peter Lang: 15

9. Ito, M (2009). Media literacy and social action in a post-Pokemon world. A keynote address for the 51st NFAIS Annual Conference. **www.itofisher.com/mito/publications/media_literacy.html**

10. Many approaches to the Sociology of childhood are also coming to position children as active meaning-makers. See, for example, Prout, A and James, A (1997). A new paradigm for the sociology of childhood. In A James and A Prout (eds) Constructing and Reconstructing Childhood. London: RoutledgeFalmer

Activity: Children these days[11]

What it means to be a child is socially and culturally contingent. It varies in time and place.

With colleagues, discuss what you think makes a typical childhood for the young people you teach.

- What are your shared assumptions about children these days?
- What are the most important influences on the children of today (eg media, family)?
- What are the implications for you as a subject/year group teacher?
- How should schools respond to those influences constructively and positively for children?
- How might this affect the ways you teach?

Digital natives?

As attention is increasingly given to children and young people's interaction with digital cultures, it is easy to assume that young people are 'digitally native.' It is often alleged that having grown up with technology, young people have a wealth of digital technology skills that far surpass those of their 'digital immigrant' parents and teachers.[12]

Many young people are confident in using a wide range of technologies and often turn to the internet for finding information. They appear to be able to learn to operate unfamiliar hardware or software very quickly and may take on the role of teaching adults how to use computers and the internet.

This is not evenly spread amongst all young people, however, but is instead affected by issues of class, race, gender and nationality. Researchers point to a 'participation gap' which signals unequal access to the opportunities, skills and experiences that will prepare students for life in the 21st century.[13]

In addition, teachers are increasingly reporting that many young people are not as knowledgeable and 'savvy' as they can appear to be. Young people's confidence about their use of technology can be misleading.

Students frequently struggle with their research skills when searching for relevant information on the internet, for example. They can find it hard to select the information they need. Teachers who set research tasks as homework complain of 'copy and paste syndrome', the situation in which they find entire chunks of, often only vaguely relevant, information which has been copied and pasted from a website into a student's homework without the student engaging with its content.

11. This activity is taken from the Futurelab handbook 'Curriculum and teaching innovation' Available online: **www.futurelab.org.uk/resources/documents/handbooks/curriculum_and_teaching_innovation2.pdf**

12. See, for example, Prensky, M (2001). Digital natives, digital immigrants. On the Horizon 9,5: 1-5. Critiques of the idea of the 'digital native' include: Facer, K, Furlong, J, Furlong, R and Sutherland, R (2003), Screenplay: Children and computing in the home. London: Routledge. Buckingham, D and Willett, R (eds) (2006). Digital Generations: Children, young people and new media. London: Lawrence Erlbaum Associates Publishers. Vaidhyanathan, S (2008). Generational myth: Not all young people are tech-savvy. Chronicle of Higher Education, 55,4

13. Jenkins, H, et al. Confronting the challenges of participatory culture: Media education for the 21st century. McArthur Foundation. **digitallearning.macfound.org/atf/cf/%7B7E45C7E0-A3E0-4B89-AC9C-E807E1B0AE4E%7D/JENKINS_WHITE_PAPER.PDF**

"I don't buy the digital natives argument, a lot of them are quite perplexed by the amount of stuff on the web, actually they have a pretty poor understanding of the reliability of sources, how to assess it and how to reference it." Year 11 science teacher

"As a teaching professional, I have a responsibility to ensure my students are not just digitally confident but digitally competent & literate." Secondary geography and Advanced Skills Teacher (AST)

Students can find it difficult to work out whether the information they find on websites they do not recognise is trustworthy, with many of them relying on their chosen search engine to display the most relevant and reliable websites at the top of the list of search results.[14] Many have little understanding of how search terms work or the powerful commercial forces that can result in a particular company being top of the search engine's list.

It is not therefore enough to assume that young people automatically have all of the skills, knowledge and understanding that they need to apply to their use of technology. All young people need to be supported to thrive in digital cultures; they need help making sense of a rapidly changing world of technology which gives them access to vast amounts of information, which is infused with commercial agendas and which for many reasons can be difficult to interpret.[15] It is teachers who have experience in the higher order critical thinking skills that can support young people's use of digital technology.

When teachers, parents and other adults subscribe to the notion of young people being digital natives, they are likely to view themselves as less informed about technology and may not therefore recognise the way in which they can support young people's digital literacy.

Teachers are ideally placed to help young people develop, not only more competent search skills but also the critical thinking skills that allow them to question and determine the reliability of information they find on the internet. Teachers can also support the other elements of digital literacy; they can help students to be creative, to collaborate, to communicate effectively and to develop cultural and social understandings and to know when technology can best be used to support these processes.

Developing digital literacy is important then because it supports young people to be confident and competent in their use of technology in a way that will enable them to develop their subject knowledge by encouraging their curiosity, supporting their creativity, giving them a critical framing for their emerging understandings and allowing them to make discerning use of the increasing number of digital resources available to them.

Activity: 21st century learner

Consider how the lived experiences of the students you teach are different from those of children who were at school in the 1960s, 1970s and 1980s.

With colleagues, draw a picture of a typical '21st century student'.

Reflect on your drawing. What are the characteristics of this '21st century student'? What are their aspirations?

Now consider what your aspirations are for them. As a subject/year group teacher what hopes and ambitions do you have for your students? What are you trying to achieve in your teaching?

What sorts of skills, knowledge and understandings do you hope to foster through your teaching that will support your students to achieve their aspirations and to be successful?

14. Ofcom (2009). UK children's media literacy: 2009 interim report. Ofcom. Available online: **www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/uk_childrens_ml/full_report.pdf** Other research which looks at the difficulties that can be encountered by young people when researching online includes Rowlands, I, and Fieldhouse, M (2007). Information Behaviour of the Researcher of the Future: Trends in scholarly information behaviours. British Library/JISC. **www.jisc.ac.uk/media/documents/programmes/reppres/ggworkpackageii.pdf**

15. Sonia Livingstone, for example, describes her experience of accidentally ordering a book in German whilst shopping online to underscore the point that a world infused with digital media is not always immediately legible to either adults or children and can be difficult to navigate. Livingstone, S (2008). Key Research, Keynote with David Buckingham at Ofcom: International

2.2 SCHOOL SUBJECTS AND DIGITAL TECHNOLOGIES

We have seen that in a society increasingly saturated with technology young people are engaging with digital cultures in which they need and expect to be able to create and manipulate media for social, cultural and economic purposes. We have also seen that they need support to ensure they have the skills, knowledge and experience to enable this.

But how does young people's use of technology outside of school relate to their experiences in school?

Just as it is important to support students' digital literacy so that they can effectively participate socially and culturally outside of school and so that they will be prepared for life after school, digital literacy is also important to life in school.

Digital technologies at home and school

School curricula aim to support young people by giving them the skills, knowledge and understanding to make sense of the world in which we live.

Over the past 20 years there has been a significant increase in the difference between young people's digital technology use outside and inside school. In the 1980s and for much of the 1990s, most children first encountered these technologies in the classroom. This is no longer the case.[16]

Children arrive at school with an existing knowledge and experience of digital media. Yet, the use of technology they experience in schools often bears little relevance to the ways in which they are communicating and discovering information outside of school.[17] This is creating what David Buckingham refers to as the new digital divide or "a widening of the gap between the culture of the school and the culture of children's lives outside of school."[18] Young people's own knowledge, ideas and values are not reflected in the education system and school learning can have little or no bearing on their lives, concerns, interests and perceived or aspirant futures.

As such, there is an argument for the acknowledgement of young people's lived realities and popular culture within schools and the respect of children's existing knowledge and experiences as a starting point for learning in the classroom.[19] Indeed studies have shown increased levels of motivation where children's own cultural knowledge is acknowledged in school settings.[20]

This acknowledgement of young people's existing cultures and expertise needs to be set alongside the school's role in opening up learners to new ideas and new cultures and in encouraging students to expand and extend their existing knowledge and to make connections and build dialogue between concepts and ideas.

The challenge is for teaching practices and the curriculum to adapt to learners changing needs in these digital media contexts. By fostering digital literacy in subject teaching, practitioners are not only acknowledging and reflecting young peoples' lived experiences of digital media cultures, they are supporting their students to extend their knowledge and become critical and discerning participants in their own in-school learning.

16. Buckingham, D (2007). Beyond Technology: Children's learning in the age of digital culture. Cambridge: Polity Press

17. Selwyn, N, Boraschi, D and Özkula, SM (2009). Drawing digital pictures: An investigation of primary pupils' representations of ICT and schools. British Educational Research Journal. 35,6: 909-928: 909; Levin, D and Arafeh, S (2002). The Digital Disconnect: The widening gap between internet-savvy students and their schools. Pew Internet and American Life Project. **www.pewinternet.org/Reports/2002/The-Digital-Disconnect-The-widening-gap-between-Internetsavvy-students-and-their-schools.aspx**

18. Buckingham, D (2007). Beyond Technology: Children's learning in the age of digital culture. Cambridge: Polity Press: 178

19. For a discussion of enquiry-based, partnership approaches to teaching and learning that aim to democratise the curriculum by allowing young people to bring their existing knowledge, experiences and curiosities into the classroom as a starting point for learning, see the Enquiring Minds project reports: **www.enquiringminds.org.uk/our_research/reports_and_papers**

20. Mayall, B (2007). Children's lives outside school and their educational impact. Primary Review Research Briefings 8/1. Cambridge: University of Cambridge Faculty of Education.

Activity: Schools these days[21]

Purpose:
Today, there is intense debate about the type of education system required to prepare young people for the 21st century. Many commentators suggest that the experiences of children have changed dramatically over the past 50 years and that schools have failed to keep pace with this change. As such there has been a drive for innovation in teaching and learning that has resulted in a number of new initiatives and curriculum changes.

It is useful for teachers to explore the context from which various educational initiatives have emerged.

Suggested activity:
Discuss/think about the current economic, cultural, political and social influences on schools.

_ What's happening in society that's causing schools to change?

_ What reforms are there? Where are they coming from? What's driving them?

_ What messages are being given to schools and do they contradict each other?

_ How can/should/must schools respond to external influences?

Digital technologies and subject knowledge
Subject knowledge is constantly evolving and the speed of this change has increased with the development of digital technologies which allow online content to be more readily produced and updated.

Creating and editing information is no longer the preserve of the educated elite; knowledge and information are now more accessible than ever and internet resources can be created and edited by anyone. Wikipedia, the popular online encyclopaedia for example, is entirely compiled and edited by volunteers working collaboratively in locations around the globe.

School textbooks have traditionally contained the information deemed by subject experts to be the essential body of knowledge to be passed on to the next generation. The growth of the internet means that these textbooks are now complemented, and sometimes contradicted, by internet resources which provide alternative sources of information in more diverse formats and modes, such as, video, audio or animations.

Digital literacy has therefore become an important resource which supports learning by, for example, allowing students to successfully find and select relevant information and access subject knowledge in different formats. Subjects of the curriculum provide distinctive perspectives and approaches for young people to actively make sense of their experiences in the world. Technology not only shapes and influences the ways in which school subjects are learnt, it can affect what young people know about school subjects and the skills that they will need in order to develop their subject expertise.

This means that teachers and learners need to engage both with traditional and well-established ways of understanding the world through, for example, historical, geographical, mathematical, religious or scientific knowledge but also need to be able to make sense of the digital media world and the way that it has the potential to impact upon traditional subject knowledge.

Developing digital literacy in subjects of the curriculum is not about being fashionable or simply about trying to engage students in learning. It is about addressing the changing nature of subject knowledge and acknowledging that young people will need different kinds of skills, knowledge and understanding in order to develop their expertise in subjects. Developing digital literacy in subject teaching supports young people to be effective, competent, critical students of that subject in the digital age.

21. This activity and other activities designed to support practitioners to explore some of the issues and challenges around curriculum change can be found in Enquiring Minds Professional Development Materials, available online at:
www.enquiringminds.org.uk/pdfs/Enquiring_Minds_professional_development_materials.pdf

Geography: A Different View

The Geographical Association's new manifesto A Different View[22], looks at the opportunities and challenges for geography as a subject discipline in the 21st century. The association take the view that whilst subject content remains important, it is also essential to develop new opportunities presented by digital technology and to support young people in gaining the skills they need to be a "skilful and employable" geographer in the 21st century.

> "A Different View is an affirmation of geography's place in the curriculum. But the world changes, and so does the curriculum."

The manifesto stresses the importance of 'real world learning' but also highlights that the geographical skills of exploration, discovery, and assembling information can be applied to the digital geographical world.

> "It is still about exploration and discovery but using media and digital technologies as well as first-hand experience."

In the manifesto the Geographical Association also emphasise the importance of young people's lived experiences and acknowledging these by incorporating them, along with young people's interests, into the curriculum.

> "Young people's lives: using their own images, experiences, meaning and questions; reaching out to children and young people as active agents in their own learning."

www.geography.org.uk/adifferentview

22. The Geographical Association (2009). A Different View: A manifesto from the Geographical Association. Sheffield: The Geographical Association. **www.geography.org.uk/adifferentview**

2.3 THE POLICY CONTEXT

Not only can digital literacy contribute to subject knowledge but seeking to develop digital literacy in subject teaching is also a way of responding to changing discourses around the use of digital technologies in the classroom and accompanying developments in educational policy.

This section moves through a number of areas of policy development to set out the context in which schools are increasingly being asked to focus on digital literacy across the curriculum and to show the importance of digital literacy in the current educational landscape more generally.

Curriculum reform

Since the introduction of the National Curriculum in 1988 there has been a significant growth in the use of digital technologies in all areas of young peoples' lives from play and socialising to learning, both formal and informal. They are more connected to each other via mobile phones, social networking and online gaming and to diverse sources of accessible information via the internet. The past decade has seen an educational policy drive to ensure that this change is reflected in schools.

Secondary curriculum reform

In 2008 the National Curriculum[23] for secondary schools in England, Wales & Northern Ireland, was reformed to give schools more local flexibility in planning and managing their own curriculum. Through a greater focus on the core capacities and capabilities thought to be essential for 21st century learners, the new curriculum aims to support young people to become successful learners, confident individuals and responsible citizens.

The new curriculum has a slimmed down subject content element and stresses the need for the development of skills such as being able to work as part of team, thinking creatively and being able to self-manage. Increased significance is placed on the teaching of ICT across the curriculum, with ICT skills forming one of the three core sets of skills to be developed across all subject teaching. A focus on digital literacy can help to facilitate the integration of ICT across the curriculum, aid the development of skills alongside subject content and therefore support the aims of the new curriculum.

> The secondary National Curriculum's "functional skills are those core elements of English, mathematics and ICT that provide individuals with the skills and abilities they need to operate confidently, effectively and independently in life, their communities and work. Individuals possessing these skills are able to progress in education, training and employment and make a positive contribution to the communities in which they live and work."[24]

The Scottish Curriculum for Excellence

The Scottish Curriculum for Excellence is based on similar aims to the National Curriculum.[25] It includes objectives for learning in 'technologies' which are closely related to digital literacy and involve supporting young people to "develop an understanding of the role and impact of technologies in changing and influencing societies", "become informed consumers and producers" and "be capable of making reasoned choices" in relation to technology.

Primary curriculum reform

In 2009, The Independent Review of the Primary Curriculum[26] recommended the introduction of a new primary National Curriculum for England, Wales and Northern Ireland, aimed at reducing prescription and content in order to allow primary schools greater autonomy in shaping a curriculum that meets local needs.

The new curriculum would share the aims of the secondary curriculum, setting out a national entitlement for all children aged 4-11, to become successful learners, confident individuals and responsible citizens.

The review positioned literacy, numeracy and ICT capability as Essentials for Learning and Life that should be embedded across all areas of learning. This increased significance of ICT is an explicit recognition of the increasing digitisation of the world in which young people are growing up and which

> "will require digital literacy of all children for their full participation in society."[27]

It also represents a shift in the way in which digital technology is viewed in the curriculum. Far from focusing solely on functional skills, it sets out an entitlement for children to develop digital literacy and the skills, knowledge and understanding that foster independent, discerning and safe technology use.

23. Details of the National Curriculum for England, Wales and Northern Ireland can be found at: **curriculum.qca.org.uk**
24. From the National Curriculum, Key Stages 3 and 4, Functional Skills
curriculum.qcda.gov.uk/key-stages-3-and-4/skills/functionalskills/index.aspx
25. Curriculum for Excellence website: **www.ltscotland.org.uk/curriculumforexcellence/index.asp**
26. Rose Review website: **www.dcsf.gov.uk/primarycurriculumreview**
27. Rose, J (2009). Independent Review of the Primary Curriculum: Final Report. London: DCSF. Quote used p71.
publications.teachernet.gov.uk/eOrderingDownload/Primary_curriculum_Report.pdf

21st century skills

This increased focus on digital technology in schools is related to a Government agenda focused on developing skills in order to ensure personal, local and national prosperity.

The Leitch Review of Skills[28] published in 2006 stated that in order to maintain global competitiveness, the UK needed to develop and enhance the 21st century skills of its workforce. In 2009 the departments for Culture, Media & Sport (DCMS) and Business, Innovation and Skill (BIS) published the Digital Britain[29] report which set out the requirements for Britain's digital future and argued that the digital skills, motivation and confidence of all citizens needed to be developed in order to enhance their participation in the digital world.

For education this has meant an increasing emphasis on its role of equipping students with the skills considered essential for their future roles in a 'knowledge economy'. The Government's Harnessing Technology strategy places an emphasis on ICT being at the core of a modern education system which aims to support young people in developing 21st century skills and competences.[30]

New pedagogical approaches that support creative, personalised learning and skills development have emerged to sit alongside the traditional approaches to the curriculum.[31] There is a focus on the 'new basics' such as thinking skills, learning to learn and problem solving, as well as specific ICT skills and the ability to be flexible, creative and innovative. Digital literacy can support many of these skills as well as having a broader reach by allowing students to learn how to engage in wide-ranging practices of understanding, using, creating and sharing knowledge when using digital technologies.

The e-safety agenda

The developments in digital technologies and increasing use of the internet and mobile technologies by young people have seen growing public and policy concerns over safety. Concerns centre on the potential for young people to be vulnerable to exposure to content that is inappropriate such as pornographic images, to abuse by adults they meet online and to bullying via new sorts of communication channels.

These concerns around children's well-being prompted the government to commission a review into children's e-safety. The Byron Review: Safer Children in a Digital World highlighted the need for young people's education and the development of young people's skills in order to keep them safe on the internet. It argued that the focus should be on preserving young people's right to take risks as an important part of their development but stressed the need to support them by equipping them with the skills needed to make informed choices and think critically about the opportunities offered by digital technologies.

The Byron Review led to the establishment of the UK Council for Child Internet Safety (UKCCIS), a coalition of government, charities and industry. In December 2009 the UKCCIS launched, 'Click Clever, Click Safe: The first UK child internet safety strategy'. This strategy sets out a commitment to parents and young people to support the development of skills, knowledge and understanding to help children and young people stay safe online and to ensure "that the school curricula across the whole of the UK reflect online safety for all age groups."[33] A focus on digital literacy in schools can help to address concerns about e-safety by furnishing students with the ability to engage safely in multiple practices surrounding the use of technology.

28. Leitch, S (2006). Prosperity for all in the global economy – world class skills (HMSO). Available online: **hm-treasury.gov.uk/leitch**

29. Department for Culture Media and Sport and Department for Business, Innovation and Skills (2009). Digital Britain: Final Report. London: HMSO. Available online: **www.culture.gov.uk/images/publications/digitalbritain-finalreport-jun09.pdf**

30. Becta (2008). Harnessing Technology: Next generation learning 2008-14 (Becta)

31. An example of this is the RSA's Opening Minds programme, a competence led curriculum. Further details at: **www.thersa.org/projects/education/opening-minds**

32. Byron Review (2008). The Byron Review: Safer children in a digital world. London: DCSF.

33. UK Council for Child Internet Safety (2009) Click Clever, Click Safe: The first UK child internet safety strategy. Available online: **www.dcsf.gov.uk/ukccis/download-link.cfm?catstr=research&downloadurl=UKCCIS%20Strategy%20Report-WEB1.pdf**

2.4 CONCLUSION: WHY SHOULD TEACHERS CARE ABOUT DIGITAL LITERACY?

This section has argued that digital literacy is important for several interconnected reasons.

- Young people need to be prepared for a successful adulthood in a world increasingly saturated with digital technologies.
- Young people are already engaging with digital technologies and digital media and using them to find information and communicate meaning in different modes and formats and this provides significant opportunities and challenges that it is important to address.
- Not all young people are equally equipped with the skills knowledge and understanding that will allow them to critically engage with technology and to use it well.
- Developing digital literacy can help students to access subject knowledge at a time when digital technologies are changing the way knowledge is created and communicated. It can also help schools to engage with children's lived experiences and existing knowledge as well as extending and diversifying this experience and knowledge to make learning more relevant and purposeful.
- There is an increasing policy emphasis on developing student's digital literacy across the curriculum.

The next section of the handbook will look more closely at the different components of digital literacy and discuss some of the ways that teachers might go about fostering digital literacy in the classroom.

3. DIGITAL LITERACY IN PRACTICE

What does digital literacy look like in the classroom? And how can teachers go about developing it within school subjects?

This section discusses the various components that make up digital literacy and, drawing on practical examples, looks at ways in which teachers can support the development of students' digital literacy in curriculum teaching. It moves on to explore a framework for digital literacy which can help teachers to plan activities with the aim of extending students' digital literacy.

Finally, the section considers issues of progression and assessment in digital literacy, the need for continuing professional development for teachers and discusses whole-school approaches to digital literacy.

3.1 COMPONENTS OF DIGITAL LITERACY

What do we mean by digital literacy?
Digital literacy is the skills, knowledge and understanding that enables critical, creative, discerning and safe practices when engaging with digital technologies in all areas of life.

Some people associate digital literacy simply with the functional skills of being able to use a computer or particular software package effectively. But digital literacy is about much more than having access to or being able to use a computer.

It's about collaborating, staying safe and communicating effectively. It's about cultural and social awareness and understanding, and it's about being creative.

Being digitally literate is about knowing when and why digital technologies are appropriate and helpful to the task at hand and when they are not.

It's about thinking critically about all the opportunities and challenges digital technologies present, whether these are, for example, Web 2.0 tools such as social networking sites and Wikis or animation and editing software or digital cameras.

It can be helpful to think of digital literacy as made up of a number of inter-related components or dimensions (see Diagram 1.1).

Diagram 1.1: The components of digital literacy

Digital literacy can be understood as the space where all of these components overlap; it is a broad and wide-ranging set of resources and practices which allow students to participate in social, cultural and economic relations in an ever more digital landscape.[34]

People's interaction with digital technologies are multiple, rich and complex; there is a wide array of practices involved in digital literacy. One useful definition for digital literacy is "the constantly changing practices through which people make traceable meanings using digital technologies."[35] The components above refer to different dimensions of digital literacy; they all support the creation and sharing of meaning and are not separate but mutually reinforce one another.

This means that an understanding of digital literacy should not begin with technology or digital tools. Understanding cultural and social issues, critical thinking and being creative all make up part of a broad set of practices that students need to wrap around their use of any tool and need to develop in order to participate effectively in any kind of culture.

Digital technologies are tools that students today are likely to come into increasing contact with throughout their lives. But they are not the only tools. An approach to digital literacy needs to start with the knowledge, understanding, skills and learning that teachers already aspire to foster in young people. It is then possible to consider how digital technologies might provide another, sometimes different context for this learning and a way to enhance and support it.

The inter-related components of digital literacy can be developed at the same time as students develop their subject knowledge. Subject knowledge provides a link between the components and gives them content. Whilst on some occasions, it may be possible to teach digital literacy discretely, it is also important to develop digital literacy from within school subjects; when it is isolated it can run the risk of becoming a content-free and therefore less meaningful approach to teaching only the functional skills of using digital technologies.

How, though, do teachers go about fostering these components of digital literacy and how can they be brought together? The section below suggests some possible ways of fostering each of these components from within subject teaching.

34. The notion of literacy as a social practice has been emphasised by the work of the New Literacy Studies. See, for example, Street, B (2003). What's 'new' in new literacy studies? Critical approaches to literacy in theory and practice. Current Issues in Comparative Education: 5,2; Barton, D and Hamilton, M (1998). Local Literacies: Reading and writing in one community. London: Routledge.
35. Gillen, J and Barton, D (2010). Digital Literacies: A research briefing by the technology enhanced learning phase of the teaching and learning research programme. London Knowledge Lab, Institute of Education: 9

3.2 FOSTERING THE COMPONENTS OF DIGITAL LITERACY

In school settings, developing digital literacy means giving students the opportunity to use digital technologies when it is appropriate and useful and it means encouraging the sorts of active, creative and critical uses of digital technologies which can develop digital literacy whilst at the same time helping students to further their subject knowledge.

In this section of the handbook we examine the components of digital literacy and give practical examples of how teachers can develop them through their curriculum teaching. It is impossible to entirely separate these components from one another; we have considered them one at a time here only to provide a coherent structure through which to discuss them.

Developing digital literacy is about developing skills, knowledge and understanding in all of the components, and in no particular order. We start here with functional skills because it is familiar territory for most teachers. This is not to say, however, that young people need to develop exceptional functional skills before they can begin to create, communicate and importantly, think critically, about digital technology.

It is also worth remembering that fostering digital literacy is an ongoing process. There is no quick-fix to developing digital literacy but instead it should be a part of a student's learning as they progress throughout their education.

3.2.1 FUNCTIONAL SKILLS AND BEYOND

Whilst it is not possible here to provide a technical account of how to teach the functional skills required to operate each of the broad range of technologies that can be used in schools, there are some important general issues to consider when seeking to ensure that students have a broad range of digital literacies including the ability to operate various digital technologies.

ICT and the curriculum
One issue is the relation between ICT and cross-curricula themes. Should functional skills be the realm of ICT lessons specifically or should they be taught across the curriculum?

There are good arguments that functional skills need to be included in both ICT lessons and in other subjects. Just as students practice writing both in specific English lessons as well as in all school subjects, so should they be practicing the skills needed to use digital technologies in all subjects, including ICT.

Recent curriculum reforms place increased significance on the skills associated with digital literacy and clearly identify ICT as a core element of the curricula, the skills of which should also be developed throughout subject teaching.

Beyond the presentational: Technology in the hands of the learner
When technology is used in some school classrooms this can sometimes be limited to making basic use of a computer. This can mean that technology stays in the hands of the teacher where it is used solely for presentational purposes. Or it can mean that when students are provided with the opportunity to use technology, they are tasked solely with making a PowerPoint presentation or completing a basic internet search. Fostering digital literacy means going beyond the functional and the presentational and giving students the opportunity to use a wide range of technologies collaboratively, creatively and critically.

Teachers and functional skills
Some teachers feel that their own functional skills are not as developed as their students and therefore question their ability to teach digital literacy. Even if a teacher knows less than a student about how to operate a particular piece of technology, they are still more equipped with the higher order critical thinking skills and the subject knowledge to apply to digital technologies.

Some of teachers' fears can be lessened by removing the mystique that surrounds technology use. The way that technology is talked about, for example, can be off-putting. When reference is made to making a podcast, this may appear to some teachers to be beyond their capabilities and confidence in using technology. But in reality it is a fairly straightforward process. It can involve using a simple computer microphone and recording some audio. A relatively simple and free piece of software such as audacity.com can then be used to edit the audio if it requires editing. The file can then be uploaded to the school learning platform or website (the person who manages the website may be able to help with this). In terms of functional skills, this is all that is required to create a simple podcast.

Throughout this handbook, we have tried to give examples of how technology that sounds complicated can actually be quite simple whilst also not ignoring the fact that some teachers quite reasonably feel anxious about using technology in the classroom. There is always an ongoing need for training and time to help teachers become confident with a wider array of digital technologies.

Fostering functional skills in learners
Similarly, developing functional skills in learners can often be a matter of allowing learners the time to experiment with different technologies and pointing them in the direction of where they can go to find help when they run into difficulties.

There is a common but arguably misguided assumption that ICT skills need to be taught sequentially. Some teachers feel concerned that younger children, for example, may not yet be able to successfully manipulate a mouse. The claim is that these children are unable to develop digital literacy until they have mastered the ability to operate computers and other technologies. But these sorts of skills do not have to develop sequentially and can instead be fostered simultaneously. We do not argue that children cannot understand television programmes until they have the functional skills to turn a television set on and tune it to a particular channel. In the same way even children who have not yet mastered basic functional ICT skills can still be supported to use technology for wider learning and can be capable of understanding ideas that are presented through technology. As they progress, they will develop more advanced functional skills as well as more complex understandings related to the content of particular media.

General tips for using digital technologies for teaching and learning:

- Ensure that your kit is working in advance, make sure you are familiar with it and prepare some other activities students could do in case of any problems with the technology. Think about the resources you will need and book them well in advance.
- If certain kit is unavailable because, for example, your school cannot afford it, you may be able to hire it or borrow it from a City Learning Centre.
- When students use digital technologies, this can result in large amounts of data – Develop a plan to manage this ahead of time (Where are children going to save their work? How will you store data and make sure it is not lost? How will you access it, and so on).
- If a particular website is blocked, talk to the IT manager if you have one or contact your local authority's ICT help desk direct – they may be able to unblock the site to allow you access.
- Be aware of copyright if students are producing work that will be uploaded to a public website[36].
- It can be tempting to intervene to ensure a high-quality end product (eg filming groups of students yourself rather than allowing them to operate the camera themselves). Support students to think about how they can improve the quality of their outputs but let them use the technology themselves and learn from their mistakes.

36. Lachs, V (2000). Making Multimedia in the Classroom: A teacher's guide: Routledge Farmer: 118

3.2.2 CREATIVITY

Creativity and digital literacy
Becoming digitally literate involves not just being active in exploring digital media but also in creating it and understanding that it is created. Digital literacy therefore supports and is supported by creativity.

Being creative is usually understood to involve generating novel ideas; it means using one's imagination to make connections between ideas and to generate creative products.[37] Creativity can be understood in terms of:

- creating a product or output
- thinking creatively and imaginatively
- creating knowledge or knowledge production

Creativity is about more than just artistic ability, it is also about how we think and how we construct and share knowledge.

Many commentators suggest that digital literacy involves practices of both critical consumption and creative production. Just as young people need to learn how to be critical in how they consume digital media, they also need to learn how to create and produce meaning through their use of digital technologies.[38] When creating their own digital media content young people can begin to question and understand how the digital media world is created by others. Just as students have created a website for a particular audience, so websites they visit have been created for certain audiences. In the same way that students have manipulated information and images in order to project a particular viewpoint, so have those who have created the online content they are accessing.

Digital technologies also provide an array of exciting opportunities for young people to create their own digital media and online content. Many students will already be using digital technologies to document their lives in some way and to create digital outputs by, for example, editing a social networking profile page, manipulating digital photographs, making short films or compiling playlists of songs for each other. Participating and communicating in an increasingly digital world requires the creative ability to effectively utilise these opportunities.

Developing digital literacy in the classroom can allow students to apply their existing knowledge of creating with digital technology to learning in school and in the process be supported to think more critically and creatively about what it is they are doing.

Is taking video footage the same as making a film?[39]

Many young people own mobile phones with video cameras built in. Outside of school they may use the cameras to document experiences they and their friends have together.

In using video in school as part of curriculum learning, students could be supported to examine the differences between simply taking some video footage and making a film.

Taking video footage requires the functional skills of being able to activate the camera and point it at the subject. Making a film requires a number of different practices including critical thought about audience, advance planning of different scenes, script writing, careful consideration of content, creative thinking about camera angles and some considerations around e-safety and copyright if the film is to be made publicly available on the internet.

Discussions around these issues will foster digital literacy and will support young people to become discerning digital participants both inside and outside of formal education settings.

Films for Learning is a website that allows visitors to view, upload and rate films made by students and teachers to support both primary and secondary curriculum learning. This website could be used to provide examples of other students' filmmaking for class discussion before asking students to make their own 'film for learning'. Some schools make students' films available on their website or learning platform so that other students can use them for revision. This is also an incentive for students and teachers to ensure subject content in films is accurate.[40]

37. Craft, Anna (2005). Creativity in Schools: Tensions and dilemmas. London and New York: Routledge: 19
38. See, for example, Davies, J and Merchant, G (2009). Web 2.0 for Schools: Learning and social participation. Peter Lang Publishing: 12; Williamson, B (2008). Games and Learning. Bristol, Futurelab: 26
39. Reid, M (2009). Film: 21st century rhetoric, technology or task? Keynote 2 at Seen and Heard: Young people creating digital media. Bristol. Transcript online: **www.futurelab.org.uk/resources/documents/event_presentations/Mark_Reid_-_transcript.pdf**
40. **www.filmsforlearning.org**

Creativity in the classroom

Fostering creativity in the classroom involves applying elements of creativity to subject knowledge. This can be done in all subjects across the school curriculum.[41] Students need to combine resources such as pens, paper, art materials and digital technologies with their knowledge of a subject in order to create an output. During this process they will need to think imaginatively and critically and use and develop their creative abilities to re-contextualise knowledge, repurpose it and make it their own. This may involve carefully considering how to use visual images, audio and text to represent meaning.

Many teachers are already aiming to foster creativity in their students but digital technologies present many more opportunities to be creative in the classroom.

There is an abundance of freely available software online that can support the creation of different sorts of outputs in the classroom and most do not require a high level of functional skill of either the teacher or of the learner.

Animating science

Key Stage 4 science students at Saltash Community School in Cornwall were learning about enzyme theory. Teacher Dan Roberts found that "one of the things students always seem to find difficult to grasp is visualising concepts like the 'lock and key' and how the active site changes shape when the enzyme denatures."[42]

He thought it might help students' learning if they could create their own animations of the process. Having never done any animation before, Dan set about asking other teachers, via the social networking site Twitter, whether they knew of any simple, free animation tools. He had a quick go himself with one of the tools recommended and decided to try it out with his Year 11 students.

The students used Doink (www.doink.com) which quickly and simply allowed them to create an animation of the 'lock and key' process which some chose to embed into a short story-like description of the process by adding text and further effects.

The animations were saved on the website. Dan was able to comment on the content of each one and they are now available for the students to use for revision, or indeed for other students to discover and learn from.

The students enjoyed using Doink and some have said they will be using it at home to create their own animations to help them create visual stimuli to support their revision in many different subjects.

41. Anna Craft suggests that "it has been argued that all subject areas in the school curriculum (or beyond) are inherently conducive to the development of a learner's creativity" Craft, A (2005). Creativity in Schools: Tensions and Dilemmas London and New York: Routledge: 37

42. Saltash.net Community School: **www.saltash.net**. Details of the Doink project including links to the students' animations and more examples of how Dan Roberts has used technology in the classroom can be found on his blog, Why did the Chickenman cross the road**: chickensaltash.edublogs.org**

Among other things using digital technologies can facilitate the creation of:

- pictures or illustrations
- websites
- films
- animations
- podcasts
- photos/photo montages
- blogs
- wikis
- online content on social networking sites
- music and song
- audio-visual presentations
- interactive maps
- graphs
- models
- learning diaries

Choosing between these different sorts of creative outputs will require critical thinking skills as students consider what is effective for what purpose. This may involve consideration of how best to create something that communicates information and meaning in particular cultural and social contexts. As children create digital artefacts using these different technologies then they also need to have a wide range of other skills, knowledge and understanding to draw on; they need to develop a broad set of critical digital literacies.

Tips for developing creativity[43]

Fostering creativity in the classroom can involve:

- providing regular opportunities for using creativity in the classroom and for creating outputs in a wide variety of formats and modes
- either setting or asking students to define a clear purpose and audience for any creative output
- supporting students to carefully plan their creative work and access the resources they will need for it
- exploring with students the needs of particular audiences and how to tailor content accordingly
- establishing success criteria with students and setting achievable goals
- supporting students to explore ideas and to engage in independent and creative thinking, allowing them to take control of their own learning and their own creative process
- identifying creative abilities in students, giving them opportunities to use their individual abilities and rewarding them
- reviewing work in progress and providing feedback
- looking at examples of other creative outputs, media or digital texts in a particular subject and asking students to assess how successful they are and analyse how they convey information and meaning
- providing students with a structure in which to use their creativity (eg making sure they have a clearly-defined purpose, audience, time-scale, assessment criteria and plan).

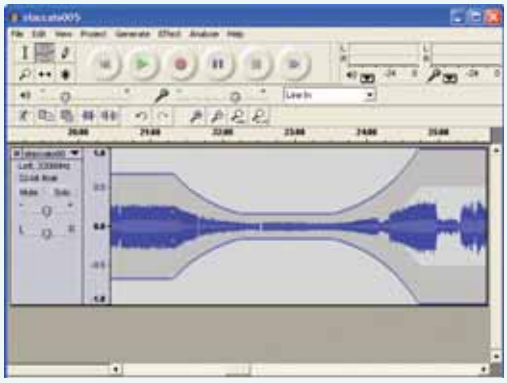
43. These tips have been informed by Savage, J and Fautley, M (2007). Creativity in secondary education. Learning Matters Ltd.

In practice

Here are some examples of the many freely available web-based tools that can support creativity[44]:

Editing audio

There are several free resources available online that allow children to create and edit audio recordings or make music. These can be used by children for podcasts or to create a voice-over or background music to accompany a film, animation or presentation. See, for example, audacity.sourceforge.net or www.jamstudio.com



Publishing podcasts and videos

Radiowaves is a free, easy to use, online community which provides students with a real audience for their creativity. It is a safe, moderated space for school children of all ages to share their podcasts and videos with others. It allows young people to post their own work, explore video and audio uploaded by others and to give each other feedback on the media they have created.
www.radiowaves.co.uk

Making games

There is a lot of software available which enables children to make, share and play their own games. Some of this is free and web-based whilst some of it requires a licence. In either case, children can be tasked with authoring a game that uses or reflects principles from a particular scheme of work. See, for example:
www.fyrebug.com/2009/09/12/yogo

Creating comics

Comic Brush allows children to create and share a comic using a combination of their own drawings or photographs which are scanned in and ready to use artwork. Children can choose from a library of characters, backgrounds and speech bubbles and add their own text and captions. Students could be asked, for example, to work in groups to create a comic to explain a component of the work they have been doing in a particular subject.
www.comicbrush.com

Animoto

This tool allows students to create short videos, rather like film trailers, from their own uploaded photos and videos clips. The service provides a library of music from which users can select appropriate music for their video or allows them to upload their own. Once music, photos and video clips have been uploaded and selected, Animoto automatically combines them to produce a video which can then be sent to an email address, posted to a social networking site or stored online. The free version allows students to produce a video of only 30 seconds long. Teachers can use this as an opportunity to encourage students to think carefully about key content and how to different forms of media to convey particular messages.
animoto.com

Editing film

Windows Movie Maker (Microsoft Windows) and iMovie (Apple Mac) are applications that allow students to edit the video footage they have taken on a digital video camera. Students can make decisions about how they should edit their footage for a particular purpose, and how to creatively use the video format and effects (eg different transitions, slowing or speeding up film, adding text) to communicate ideas.
www.microsoft.com/windowsxp/using/moviemaker/default.mspx
www.apple.com/ilife/imovie

44. The Enquiring Minds website has more examples of free online tools that can be used to support creativity and digital literacy: **www.enquiringminds.org.uk/try_it/digital_tools**

3.2.3 COLLABORATION

Collaboration and digital literacy
Learning involves dialogue, discussion and building on each other's ideas to create shared understandings. Digital literacy is also a social process of meaning-making that takes place with and in relation to others.

If digital literacy prepares students to take an active part in their education and in social, cultural, economic, political and intellectual life, then the ability to work with others is paramount. Each of these arenas are shared, social spaces or communities in which we create and make use of mutual and collective understandings.

Many of these spaces are infused with digital technologies. Students need to understand how to participate in these shared spaces and this means that they need to learn collaborative skills and they need to learn how to apply these skills to digital technologies.

When students participate in collaborative group work they need to be able to explain their ideas and enter into negotiations when those ideas do not align with others in the group. Learning how to collaborate can therefore also help students to develop skills of debate, flexibility, cooperation, compromise and listening.

Digital technologies provide multiple opportunities for team work and there are many free web-based tools that have been developed specifically to support collaboration.

Wiki sites are built to encourage collaborative creation of text allowing people to edit and update each other's writing to create a shared body of knowledge.

Google provides GoogleDocs, an online web-based application that allows text based documents, spreadsheets and presentations to be uploaded, accessed from any computer with a connection to the internet and collaboratively edited. This would allow a group of students to work on the same document even if they weren't all in the same physical space at the same time.

Why are volcanoes dangerous?

A geography teacher at Brislington Enterprise College gave a class of Year 7 students the task of explaining to others why volcanoes are dangerous. The students worked in groups to choose an audience and find information in order to come up with a persuasive argument and to select an appropriate format to present that argument in.

Some groups created blogs or filmed models of erupting volcanoes whilst others made online quizzes or PowerPoint presentations. Students were supported to think about what they needed to do in order to work well together and to evaluate how they had used particular technologies. Comments from the students included:

"It was probably the best project we've done."

"We all had different jobs to do and so we all had to get our job done to get it all sorted."

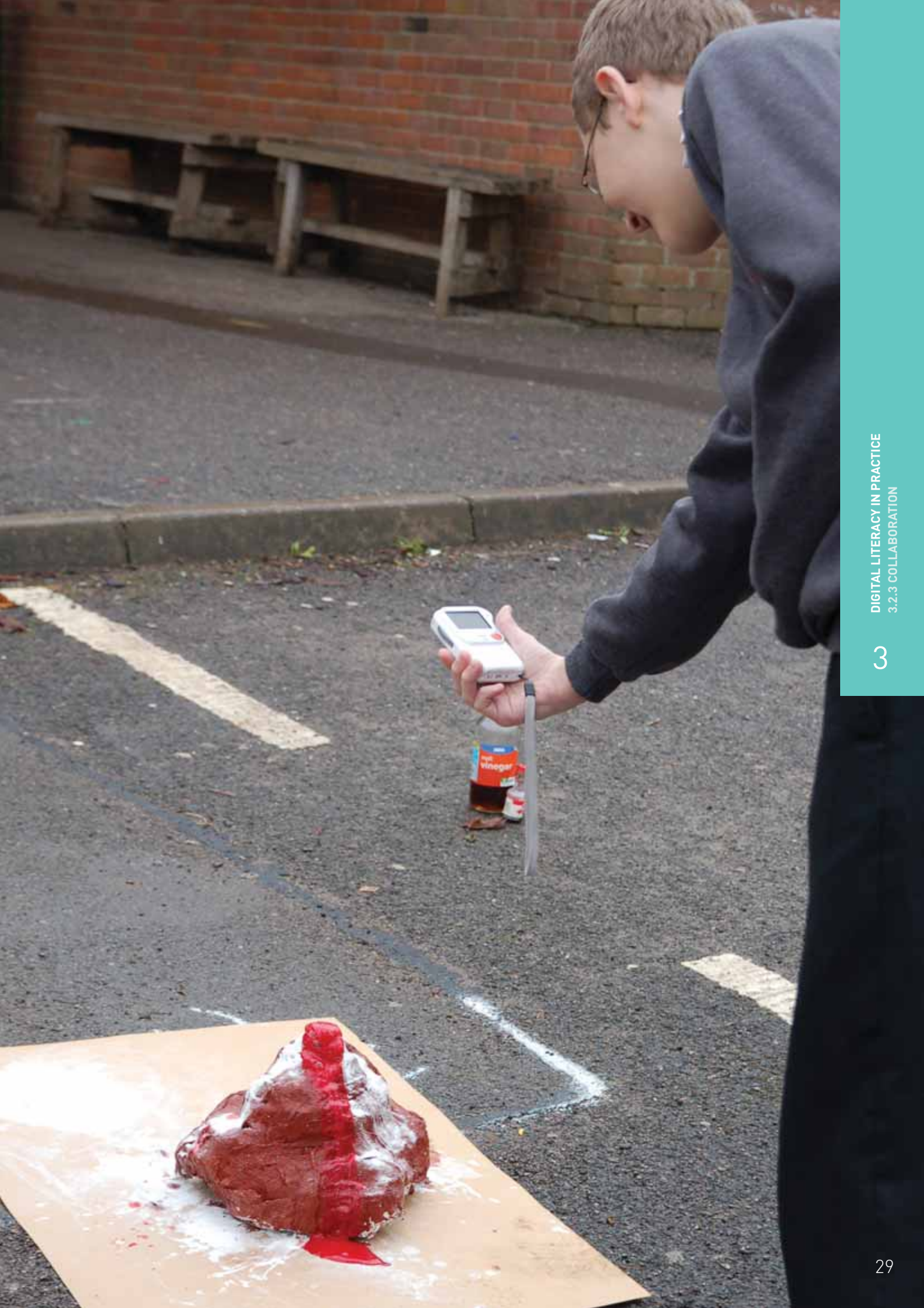
"He knew how to do a blog and I didn't. We helped each other."

Tools like **drop.io** provide a shared space for students in a class or group where they can upload documents, notes, links and can comment on each other's work in real time.

Wallwisher allows the creation of a virtual notice board where students can post their thoughts on a particular subject: **wallwisher.com**

These technologies can also be used to support collaboration beyond the school walls. For example, some teachers have made links with schools in other parts of their country or in other nations and developed projects that allow students to work together. This might be a project in which students can email young people in a school that is culturally very different to theirs in order to develop new cultural understandings or it might involve the joint creation of a digital artefact.

Students at three Bristol primary schools and their local secondary school for example, are working together on a collaborative project about their local community, using a shared online map, set up on GoogleMaps.


vinegar

The students are exploring place, considering what various local outdoor spaces mean to them, what they enjoy about the space, what they don't like about it, where they feel included and where they feel excluded and why. Across the four schools the students are working together to document their thoughts and feelings about particular spaces by annotating the shared online map and adding links to photo montages or video documentaries they have created. Through the project, the students are learning about each others' experiences of different places in their neighbourhoods. Once completed, the map will be made public and students will invite the local community to explore the resource and their views.

Although many new tools and technologies are aimed specifically at facilitating collaboration, this does not mean however that it is automatically easy to collaborate using digital technologies.

> "Working as a team can be hard, we try to listen to each others' ideas and, then like, combine them." Year 5 student

Students of any age can find group work hard, particularly if they have become used to and comfortable with working on individual tasks. Teachers can facilitate effective group work by supporting students to develop strategies for making collaboration easier.

Tips for supporting collaboration in the classroom:[45]

- Optimum group size is three or four students, maximum six.
- Discuss group skills and ask students to think about what successful collaboration looks like.
- Consider rearranging the teaching space to facilitate group working.
- Encourage students to create 'group rules' in order to set expectations of one another within the group.
- Ask students to define a role for each group member and support them to produce a group plan of how they intend to complete the given task.[46]
- Have regular mini-plenaries in which you support group reflection and progress by suggesting a number of points to consider.
- Encourage a mutually supportive learning environment in which students discuss ideas and help others in their group.

In practice

A wiki is an online space that can be edited and updated by a number of authors. Wikis provide opportunities for encouraging collaborative collation of information and creation of text. Setting up a wiki is simple to do. Websites such as **pbworks.com** have free options for classroom use and provide instructions. Examples of teachers using wikis in educational settings:

- for students to create a joint class statement about a particular topic
- for students to create a shared resource with students from another school in another country to develop shared cultural understandings around each others' digital media use
- to develop a shared bank of definitions of terms with students adding, modifying and updating each others' definitions and adding new terms
- for a collaborative science fiction writing project in which groups of students wrote different chapters together, building on previous chapters.[47]

45. These tips are informed by McGregor, D (2007). Developing thinking developing learning: A guide to thinking skills in education. Open University Press: 55

46. The Critical Skills Programme suggests having defined roles within groups to facilitate collaboration. The roles the programme suggests are: facilitator, resource manager, time keeper, scribe, negotiator. It is important that the job descriptions of the above are clearly defined and negotiated within the group. **www.criticalskills.co.uk**

47. Davies, J and Merchant, G (2009). Web 2.0 for Schools: Learning and social participation. Peter Lang Publishing.

3.2.4 COMMUNICATION

Effective communication and digital literacy
Communication is central to our day to day lives as humans: it is the ability and desire to share thoughts, ideas and understanding. Being digitally literate means communicating effectively in a world in which much communication is mediated by digital technology. Over the past 20 years the prevalence of the mobile phone has brought opportunities for telephone conversations on the move, text messaging and picture messaging. The internet and Web 2.0 technologies have provided new methods of communication such as email, instant messaging, social networking sites, forums, blogs and wikis.

A digitally literate person is a critical and discerning user of digital communication tools with the knowledge, skills and understanding that enables them to choose the most appropriate communication tool for the task in hand and how to use it effectively. Communication in the classroom allows students to share information, to re-contextualise and repurpose their developing subject knowledge in order to create and internalise new understandings and present this to others.

> "Schools have always tried to develop communication skills, but today that's not just about speaking confidently, having a good public speaking voice, now people use digital media as visual aids. The first generation of that was a PowerPoint with bullet points, but now decent communication skills include using visual images and multimedia effectively. Who's going to teach them to do that if we don't?" Secondary science teacher

Good communication involves an awareness of creating something for someone else, the ability to consider the needs of particular audiences and to communicate potentially complex ideas with clarity and lucidity. It can involve choosing appropriate formats, tools and media and thinking about the specific affordances of those formats, tools and media and how they can be used to represent meaning.

Critical digital communication skills
Fostering digital literacy will also mean asking critical questions about digital communication tools and their use. When communicating using digital technologies, young people can be supported to question whether they are using digital technology for a purpose; digital tools should not be used in communication just for the sake of using digital media, there needs to be a clearly defined reason for doing so.

Young people also need to think critically about how meaning is represented by different media and how this relates to cultural, social and political values. They need to consider the type of media they are using and which is best for the task they have been given, eg they may be excited at the thought of making a podcast, however if the information they are trying to convey is particularly visual, then a podcast may not be the most suitable tool for the task.

> "With a podcast you could listen to it over and over again to help you revise." Year 11 student

Teachers can support students to consider the implications of whether or not their output will be made publically available online by having whole class discussions on issues such as:

- the relevance, suitability and security of the information they communicate publically
- who and what they are representing (identity)
- digital permanence - once information is online, it is not necessarily easy to remove.

Students and teachers should also be aware that some online tools allow people to use a free version but this can mean their presentation is stored online and made publically available. Of course with some other tools such as a blog, the very purpose of the tool is to make the communication a public one.

> "It's hard to put a picture into words in a podcast. Looking at a picture is easier for some parts of this learning." Year 11 student, thinking about communicating DNA structure

Audience
Effective communication is not only concerned with the skills of delivering an end product (eg a presentation) to an audience. In order to communicate ideas well, it is important to reflect on the needs and prior understanding of the intended audience throughout the process of developing the product.

Supporting young people to focus on an audience in this way encourages them to source information that they can understand and then re-contextualise so as to pass it on to others. It involves making purposeful decisions over what information to include and what to discard. This not only improves communication skills, it supports young people to critically engage with knowledge in a focused and meaningful way.

> "We're not just saying random things like blah blah blah, we're thinking hard about which places to film, what people should see, we're planning it." Year 6 girl involved in a cross-curricular project in which students created a digital prospectus for their school

Not another PowerPoint!
The Microsoft Office application PowerPoint has become the most commonly used digital tool for presenting information, both in educational and business settings. Many teachers and students have begun to question the way in which PowerPoint is used in schools.

For example, in the past, students may have used PowerPoint in a very simple way, without considering content and audience. Typically this may have involved simply copying and pasting some information from a website to their presentation slides, possibly using bullet points and adding some images. Giving their presentation may have involved reading the text from the slides.

In a classroom environment that aims to foster digital literacy, teachers need to support students to reflect on the use of PowerPoint, to consider whether it is the most appropriate tool for the task given and if so, how to maximise its effectiveness. It is useful to consider how students, and indeed teachers, might have used PowerPoint in the past and to question whether the methods of use that have become the norm are necessarily the best.

One teacher set his Year 11 students a challenge. They could choose to use PowerPoint as a communication tool only if they avoided using bullet points, kept text to a minimum, chose images that clearly supported what they were going to say in their presentation and included one animation/moving image. As a result the students, who agreed this was "not the usual sort of PowerPoint," begun to think more about their communication skills and delivered interesting, thoughtful, informative and entertaining presentations.

Tips for "not the usual sort of PowerPoint"

It is helpful to give students tips to support their use of PowerPoint:

- Avoid using a large body of text on a slide.
- Always repurpose information and put it into your own words; don't just copy and paste.
- PowerPoint should be used to support your presentation; it is not the main part of your presentation. Don't read from slides but use them to show supporting information.
- Think carefully about colour schemes – some colours can help to make information stand out, other colours will be hard to see.
- Carefully consider the images you include and the meanings they infer.
- Don't use too many slides.

Tips for developing communication skills

- Encourage students to distinguish between effective and non-effective communication and to discuss what constitutes effective communication.
- Give students adequate time to plan any form of communication and including time for students to regularly review their work.
- Make sure students are aware of what audience they are communicating with and encourage them to think about the needs of that audience.
- Try to create real audiences for students – this may mean developing relationships with the local community or with other teachers.
- Make sure that when students communicate to an audience, they are given feedback - this can help students to improve their communication and also means that the audience has an active role to play. If the audience is the rest of the class as a whole, it can also help to encourage students to listen to others and provide opportunities for peer teaching and peer assessment.

Why is DNA the molecule of life?

Year 11 science pupils at St. Mary Redcliffe & Temple School in Bristol answered the above question 'Why is DNA the molecule of life?' by creating a presentation for their peers which would then be made available on the school's learning platform to be used for revision.

The purpose was to further their subject knowledge by researching information and re-contextualising it in a digital format.

> "We're only putting the important stuff into the video, so we've got to learn it more so we know what to put in." Year 11 student

The students were also supported to develop their communication skills by considering what makes a good presentation and which digital media tools would be most appropriate for the task from a choice of PowerPoint, video and podcast.

Prior to the task their teacher taught a number of lessons using the three different media and encouraged students to think critically about which were most effective.

> "I reckon you can get more things across by doing a video because you're actually seeing someone doing something. When you're seeing stuff you can take it in, it's easier to understand." Year 11 student

The students worked collaboratively in small groups to create presentations in their chosen format. They then presented to the class and peer evaluated each others' communication skills, including their choice of digital media.

3.2.5 THE ABILITY TO FIND AND SELECT INFORMATION

Another dimension of digital literacy relates to students' ability to find and select reliable and relevant information. This includes an awareness of where it is best to search for information and whether the internet, a book search, or another method might give the best results.

This is an aspect of digital literacy that students often struggle with. When tasked with undertaking independent internet research many students are not equipped to find relevant information that they can understand. Often they simply find a website that seems to be related to their given task and copy and paste straight from the website into their work. This raises concerns over whether students have engaged with the content they have found and over issues of plagiarism.

Students need to be encouraged to think carefully about how to find information and use sources selectively to help them make an argument or carry out an activity. Developing digital literacy supports good research and study skills and vice versa. Being digitally literate means critically engaging with internet content and being able to judge the value of that information for a given task.

This supports students to develop subject knowledge by furnishing them with the resources they need to become independent and critical learners who can make full and discerning use of the vast amount of constantly updating information the internet gives them access to, in order to further their learning.

Critical thinking and internet research

The ability to find and select information involves students critically engaging with the content of material they find on the internet and relating it to the subject knowledge they already have and are seeking to develop. This means going beyond simply checking the reliability of information by searching on multiple sites.

David Buckingham, for example, suggests that young people can be supported to examine a number of issues in relation to the internet and he groups these under the following headings:[48]

- **Representation**: how websites claim to tell the truth, establish credibility and the veracity, credibility and bias of their content.
- **Language**: the user-friendliness and interactivity of a website and how the graphic design and visual images have afforded those.
- **Production**: how web articles are actually authored and who uses the web (corporate, political parties, individuals etc) in order to persuade and influence, the role of advertising and other commercial influences
- **Audience**: who the website is aimed at, targeted advertising, user interactivity and how websites are used by commercial companies to gather data about individuals.

Not only do students need to think about how the information they are finding on the internet relates to their research purpose and questions, they also need to think critically about issues of representation, language, production and audience.

Fostering the ability to find and select information in the classroom

Thinking critically about internet research can be challenging for students and teachers may find that they need to scaffold students' engagement with the internet. Where internet research is set as homework, there may need to be some in-class discussion about the skills of using the internet to find and select information and the teacher may need to actively design tasks and projects so that they require students to critically engage with the material they are finding.

At the most simple level, teachers can give students information about how to construct their web search so that they are more likely to find relevant information. Students should be encouraged to be as specific as they can and to include several words rather than just one when creating search terms.

48. Buckingham, D (2007). Beyond Technology: Children's learning in the age of digital culture. Cambridge: Polity Press.

Putting their search term in brackets will ensure that results contain the complete and exact phrase they are looking for. Using the word define, followed by a colon and a search term (eg define: critical thinking) will return definitions of a particular word. Students can also be taught to use Boolean terms such as AND, OR or AND NOT. For example, using AND in a search term (eg "critical thinking" AND "digital literacy") will ensure that search results include both phrases included in the search term.

Beyond this, teachers can also help students negotiate the large amount of information available on the internet and start to think about the purpose of their research in order to select the information they need. This involves engaging with the content of the material they are finding and being aware of what information is relevant, suitable and helpful for their task.

Students should also consider whether the information they find is reliable. Many teachers suggest that students check the information they are citing on at least three independent sites. This is one way to support students to think about the reliability of internet sources but as we saw above there may also be room for class discussion around more complex issues about the cultural, social and historical forces that determine who gets to make 'valuable' and 'reliable' knowledge claims.

Finally students will need to think carefully about how they are going to use the information they find on the internet. How can it be repurposed and re-contextualised so that it fits their particular purpose? How does it relate to their pre-existing knowledge? How can it support their argument? How will they cite this new material? What format will they present the information in? (visually, textually, in bullet points, and so on).

Teachers can support this process by ensuring that students are clear about the purpose of their research (perhaps by providing questions or supporting students to design their own specific research questions) and that they are asking students to complete a task where they will need to use and understand the information they have found not just regurgitate and repeat it. Asking students to re-contextualise information for a real audience can help students to purposefully consider content.

Copyright, intellectual property and plagiarism

Netskills, a training and staff development service for schools and other sectors, have suggested that 55% of teachers surveyed in 2008 felt their students "did not have sufficient understanding of what plagiarism was and what counts as legitimate research."[49]

They offer the following suggestions for teachers regarding preventing plagiarism in schools.

- Discuss plagiarism with students and make sure they know what constitutes plagiarism, including in relation to the use of music and images.
- Reduce the probability of receiving 'off the shelf' answers by setting work on unusual topics or in different formats. eg ask students to create a website, blog or brochure from their internet research.
- Task students with applying the information they are researching to make an argument. Eg ask "to what extent did Tony Blair increase the powers of the Prime Minister?" rather than "What are the powers of the Prime Minister?"
- Make it explicit that you will be assessing students' use of sources and ensure that students understand how to reference the material they find online.
- Ask students to comment on and evaluate the sources they have used.
- Encourage originality in student's work by personalising tasks and asking for individualised responses.
- Specify the sorts of sources students should use eg date and format.
- Orally question students on their research to make sure they understand what they have written and have not copied and pasted without engaging with content.
- Issues of plagiarism can and should be addressed in everyday subject teaching rather than as a separate issue.[50]

49. From Plagiarism, the web and schools PowerPoint presentation. Netskills: **www.netskills.ac.uk/content/projects/eduserv-info-lit/plagiarism-materials.html**

50. These tips are informed by Netskills' materials on plagiarism: **www.netskills.ac.uk/content/projects/eduserv-info-lit/plagiarism-materials.html**

Supporting research skills on the internet

One RE teacher asked students to work in groups to create a resource for future students to use in a scheme of work on rites of passage from different cultures. Students needed to find the relevant information and so she gave students a number of tips for internet research

"The internet is a great resource, but it is also a public forum, where anyone can make any claim. If you find an article that provides relevant information for your research topic, you should take care to evaluate it to make sure it is valid and reliable.

Make sure you are clear about the topic you are researching – Check with me or your team if you are not sure.

When you find relevant information, try to check that it is valid and reliable – Look for the author's name, if there isn't one then don't use it. Search for information on the author and see what you can find out about them – are they an expert in this field? Or just someone that had an idea?

Check the sources and links within the website – This might show you what information is being supported with evidence from other sources.

Look for the date of the information – Has it been updated recently? Is it up-to-date?

Is the website appropriate for your task? – Think about what you are trying to achieve with your research – does the information help you? If not don't use it! Consider your audience – is it the right level for them (and you) to understand? – If not, don't use it! Look at the name of the website – are they trying to sell you something or present a biased view?

Consider your own safety and the safety of others – Are you being asked to provide any personal details? Are you communicating with something you don't know? If the answer is yes then DON'T USE IT!"

In practice

The **All About Explorers** website was developed by a group of teachers as a teaching tool for educating students about research and the internet. It provides lesson plans and handouts that teachers may find helpful when designing activities to support students' ability to find and select information.
www.allaboutexplorers.com/teachers

Jamendo is a useful site for students to find free and legal music downloads for their creative outputs. All the music on Jamendo is produced under Creative Commons licenses, which enable musicians to give their music away for free, whilst still protecting their rights. This avoids copyright issues of students downloading and using, for example, chart music to add to their digital creations and presentations. **www.jamendo.com/en**

3.2.6 CRITICAL THINKING AND EVALUATION

Critical thinking and digital literacy
A digitally literate student is not just passively receiving information or meaning but also contributing to it, analysing it and shaping it. This requires critical thinking.

Critical thinking involves transforming, analysing or processing given information, data or ideas. It means using your reasoning skills to engage with material, to question, analyse, scrutinise and evaluate it and to create an argument about it. It is about being reflective, interpreting meaning and determining significance in order to make purposeful decisions and make informed sense of the world around us. Critical thinking requires practice as students question everyday experiences and ask what other influences and assumptions might be involved other than those that are immediately obvious.

Students need to engage in critical thought in order successfully develop other elements of digital literacy such as creating outputs and choosing which tools and format to use for particular purposes and audiences and developing cultural and social understanding.

Critical thinking underpins all aspects of digital literacy.

> "If we teach children to read and write, provide them with factual information, but do not equip them with the cognitive skills to understand, appreciate and transfer or connect ideas, then the information they have may be meaningless in the future."[51]

Fostering critical thinking in the classroom
Fostering critical thinking in the classroom can sometimes be challenging, it takes a commitment to setting up the right atmosphere that allows for questions and reflective thought.

Some teachers report that young people are often eager to complete tasks and then to move on to the next one without stopping to evaluate and consider. This reflects the traditional emphasis placed on the importance of outputs in the classroom and the imperative of needing to complete a task within the designated time frame of the lesson.

Fostering critical thinking requires teachers and students to slow the pace of the classroom down a little to allow the space for thought and questioning. It involves developing a culture of debate and discussion in the classroom and supporting students to reflect and evaluate throughout the process of producing a piece of work, rather than saving the evaluation for the finished piece.

The sorts of questions that can foster critical thinking include:

_ Do you agree with this?
_ What do you think?
_ Why do you think that?
_ How do you know?
_ Can you be sure?[52]

Digital technologies can support critical thinking by providing opportunities for students to present an argument, evaluation or analysis. Students might do this in written form by creating a blog, Wiki, presentation or report. They might use visual or audio formats by creating podcasts, films or animations. In each of these cases, the student is practicing their critical thinking skills and developing their digital literacy in order to create and communicate an argument. This means critically engaging not only with subject knowledge but also with how to write and communicate using different technology and media.

Technology can also provide opportunities for students to talk to others about their views and perspectives on an argument via email, online debates, forums and chatrooms, instant messaging, video-conferencing and so on. This involves considering what sort of questions they need to ask, evaluating the views of others, and thinking critically about how those views and their own have been informed by social and cultural understandings. It will also involve ensuring that they stay safe and communicate appropriately.

51. McGregor, D (2007). Developing Thinking Developing Learning: A guide to thinking skills in education: Open University Press: 25
52. McGregor, D (2007). Developing Thinking Developing Learning: A guide to thinking skills in education: Open University Press: 74

Critical questioning of digital technologies
Developing critical frameworks allow young people to begin to understand the powerful political, cultural and commercial forces that influence their lives. As a subject for critical thought, digital technologies themselves need to be questioned.

Just as an English teacher or media studies teacher may encourage students to question the motives behind a piece of text by looking, for example, at the political perspectives behind a particular newspaper article, so teachers who aim to foster digital literacy can support students to think about how technologies are not neutral but are made and created and reflect certain biases, priorities and ways of thinking.

Topics for classroom discussion could include the role of technology in contemporary society, the commercial strategies that operate through technology and who makes technology and why. In order to engage critically with digital technologies, students also need to actively interpret and assess the reliability of information presented through technological mediums, including films and the internet.

In practice

www.blogger.com can be used to set up a simple blog. Each fortnight, for example, students could write a short blog post on what they have learned about a particular topic or a group of students could be tasked with keeping an ongoing blog documenting their experiences of working together on a project. Students can be encouraged to comment on each others blogs although the teacher will need to remind them about the need for appropriate and constructive comments.

www.exploratree.org.uk provides a free online library of thinking guides. These can help students structure their thinking on a particular topic.

Tips for fostering critical thinking in the classroom

- Encourage students to ask questions, to seek elaboration, to rationalise ideas and to judge accuracy, value and authenticity.
- Model the process by engaging in self-analytical, reflective teaching practices.
- Ask thought provoking and challenging questions of students, presenting interesting ideas and encouraging discussion and analysis of these ideas.
- Ask students to consider the positive and the negative aspects of an idea or a particular technology.
- Ensure that there is time for reflection throughout the learning process not just at the end of a project.
- When students encounter or make a claim, encourage them to consider what the starting assumptions for that claim may have been, what evidence supports that claim and what implications result from that claim.
- Reward critical thinking and analysis and build them into assessment criteria.[53]

53. McGregor, D (2007). Developing Thinking Developing Learning: A guide to thinking skills in education: Open University Press. Wegerif, R (2003). Literature Review in Thinking Skills, Technology and Learning. Nesta Futurelab. Claxton, G (2002). Building Learning Power. TLO Ltd.

3.2.7 CULTURAL AND SOCIAL UNDERSTANDING

Cultural and social understanding and digital literacy

The practices of literacy that facilitate the processes of making, understanding and sharing meaning with digital technologies are always situated in broader contexts. Young people exist in cultures and networks and experience multiple interactions with others. Each act of digital literacy they engage in has sociohistorical antecedents; it is an act of literacy because it is related to and supports these broader understandings, activities and interactions around the creation of meaning.[54]

Indeed, developing cultural and social understanding is essential in enabling young people to participate not just socially and culturally but also politically, economically and intellectually. Cultural and social understanding equips students with a language and context for their digital literacy.

Cary Bazalgette draws an analogy with moving to a new country. If you want to fully participate in the life of this new country, you need to understand much more than the simple mechanics of the language which is spoken there. You need to know how what you say and what you do might be interpreted and why this might be. You need to understand that the same actions may have different meanings in different cultures and you need to understand the sorts of practices that take place in different cultures. You need to recognise that there are certain social, cultural and historical influences that shape your understanding and learning.[55]

54. Gillen, J and Barton, D (2010). Digital Literacies: A research briefing by the technology enhanced learning phase of the Teaching and Learning Research Programme. London Knowledge Lab, Institute of Education: 8

55. Bazalgette, C (2004). Being Literate: Functional skill or cultural participation? Keynote, Osaka Kyoiku University. **www.carybazalgette.net/writing.html**

This involves understanding how both your own and others' perspectives have been informed by cultural heritage. This is part of becoming aware that many things that may appear at first glance to be natural and neutral are in fact created by particular cultural and social understandings. For example texts are always produced from a particular viewpoint and as such, they position readers in particular ways.

Digital technologies, particularly online spaces, provide young people with opportunities for many new forms of interaction. Increasingly these interactions are mediated by different modes of representation such as images and sounds. Being able to decode these multimodal texts requires an understanding of the social and cultural practices that surround their creation.

In addition these multimodal forms of representation will become increasingly powerful as cultural practices in themselves.[56] In order to participate effectively in these practices young people will need to develop the social understanding required to successfully negotiate and interpret culturally contingent meanings.

In order to develop a social understanding of their own culture and other cultures and to negotiate changes in cultures, students need to engage their critical thinking skills.

Fostering cultural and social understanding in the classroom

Cultural and social understanding will underpin most of the activities teachers undertake to support students' digital literacy development. In creating their own digital content and communicating with others young people will be constantly drawing on cultural references and their own experiences of digital media. They will, for example, be influenced by the style of texts and the use of images and sounds they experience in popular cultures. Even their imaginations will be rooted in cultural experience.[57] The task of digital literacy teaching is to make this more explicit to students.

Using digital technologies in the classroom can provide teachers with the opportunity to make links between school learning and popular culture. When students are supported to reflect on and critically examine digital media such as websites, photos or films, they can begin to understand that the way we create and communicate meaning is affected by our cultural understandings and experiences.

Tips for fostering cultural and social understanding in the classroom:

Teachers may find that they are able to help students to develop their cultural and social understanding by:

- asking students to discuss and analyse the cultural influences in a particular text or piece of media
- asking students to think about what cultural and social influences have shaped our understandings of a particular subject or area of learning
- discussing how texts and other media convey meaning and how different people have responded to this
- asking why some texts are considered culturally valuable
- asking students to consider how their own cultural knowledge affects their own understandings, using questions such as why do you think that?
- asking students to repurpose a piece of media for a different culture or audience
- making links with a school in another country and collaborating on a piece of work.[58]

56. Carrington V and Marsh, J (2008). Forms of literacy. For Beyond Current Horizons. Bristol: Futurelab
www.beyondcurrenthorizons.org.uk/wp-content/uploads/ch3_final_carringtonmarsh_formsofliteracy_20081218.pdf
57. Burn, A and Durran, J (2007). Media Literacy in Schools. Practice, production and progression. London: Sage
58. For an example of this sort of activity, see **nflrc.hawaii.edu/networks/nw44/furstenberg.htm**

In practice

Flickr is an online photo sharing space that allows users to upload, organise and 'tag' their photos with relevant categories. Flickr has a thriving social community in which people comment on each others' work, join special interest groups or upload photos to groups that have been started around a particular theme.

Images are uploaded by people around the world and are searchable by anyone. This provides several interesting opportunities for Flickr to be used in the classroom to support social and cultural understanding.

Below are just a few suggestions.[59]

Cross-cultural comparisons

Use Flickr's search function to find images that have been tagged with an aspect of life you would like to compare across cultures eg wedding, school, holiday, birthday cake. Use the images to prompt class discussion around cultural differences.

Meaning-making

Images convey meanings and it is in part our implicit social and cultural understandings that allow us to interpret these meanings. Giving titles to images, as many people do on Flickr, can alter meaning, challenging or confirming assumptions. Exploring images can prompt class discussions around how we understand and make meanings. Students could also experiment with changing the titles of images. How does this change the image's meaning? What cultural references are they drawing on now? Can they challenge some of their assumptions?

Representing meaning

Different cultural and social understandings affect how people present meaning. Using digital cameras, either provided by the school or on their mobile phones, ask students to take images related to a particular theme. Ask students to experiment with how a certain approach/camera angle can change what they are trying to convey. For example you might ask students to take pictures of spaces around the school to reflect how they feel in those spaces. Or you might ask them to take self portraits. The students can then upload their images to a communal Flickr account and explore together how different approaches and social contexts can affect the meaning conveyed by an image.

All of these activities can be related to students' wider experiences of digital media supporting them to understand that all modes of communicating information are infused with social and cultural meanings.

59. All of these, and further ideas for using Flickr in the classroom can be found in an account of how people use and learn with Flickr: Davies, J (2009). A space for play: crossing boundaries and learning online. In Carrington, V and Robinson, M (eds) (2009). Digital Literacies: Social learning and classroom practices. London: Sage.

3.2.8 E-SAFETY

"Sometimes you can click on videos you want and they're not the right videos. And they're rude or they're really bad." Year 5 student

E-safety is an important component of digital literacy. Supporting young people to become competent, discerning users of technology is about helping them to develop the skills that allow them to critically question their own and others' technology use. Becoming digitally literate will enable young people to make considered choices that will keep them safe when exploring, communicating, creating and collaborating with digital technologies, including the internet and mobile phones.

When seeking to develop students' digital literacy, is it important that teachers make explicit links to e-safety – whether this be about age appropriate content, concern over the predatory behaviour of adults, acceptable use and cyber-bullying or issues of plagiarism, copyright and virus protection.

In recent years the e-safety agenda has moved from a paternal emphasis on protecting children to the idea that we should support children to develop the skills, knowledge and understanding that will enable them to make informed decisions in order to protect themselves on an ongoing basis.

E-safety then, is closely related to fostering critical thinking skills. Many schools, especially primary schools, have well developed e-safety curriculums and are already pursuing whole school policies to foster their student's ability to stay safe online.

However as well as learning how to be safe online in specific lessons dedicated to e-safety students need to be supported to consider safe and appropriate use of digital technology in whichever context they use it.

Developing students' digital literacies means supporting them to think critically about why certain practices are unsafe and how they can be made safer. A digitally literate individual will be critically aware and able to ask questions of any situation they find themselves in online.

A recent Ofsted report stressed the importance of supporting children to manage online risks by developing their knowledge and understanding of e-safety issues. The report recommended that schools move from having 'locked down' ICT systems in which many sites are inaccessible to teachers and students to 'managed systems' in which fewer sites are blocked. Inspectors found that in schools with managed systems, students had a better knowledge of how to stay safe online, both inside and outside of school because they had been supported to take responsibility for themselves when using new technologies.[60]

60. Ofsted (2010). The Safe Use of New Technologies. London: HMSO. **www.ofsted.gov.uk/Ofsted-home/Publications-and-research/Browse-all-by/Documents-by-type/Thematic-reports/The-safe-use-of-new-technologies**

Zip it, Block it, Flag it

Zip it, Block it, Flag it, the 'green cross code for the internet' is the public awareness campaign launched alongside Click Clever, Click Safe, the first UK internet safety strategy[61] . It urges young people to:

Zip it – keep your personal stuff private and think about what you say and do online

Block it – block people who send nasty messages and don't open unknown links and attachments

Flag it – tell someone you trust if anything upsets you or someone asks to meet you offline.

Resources to support e-safety

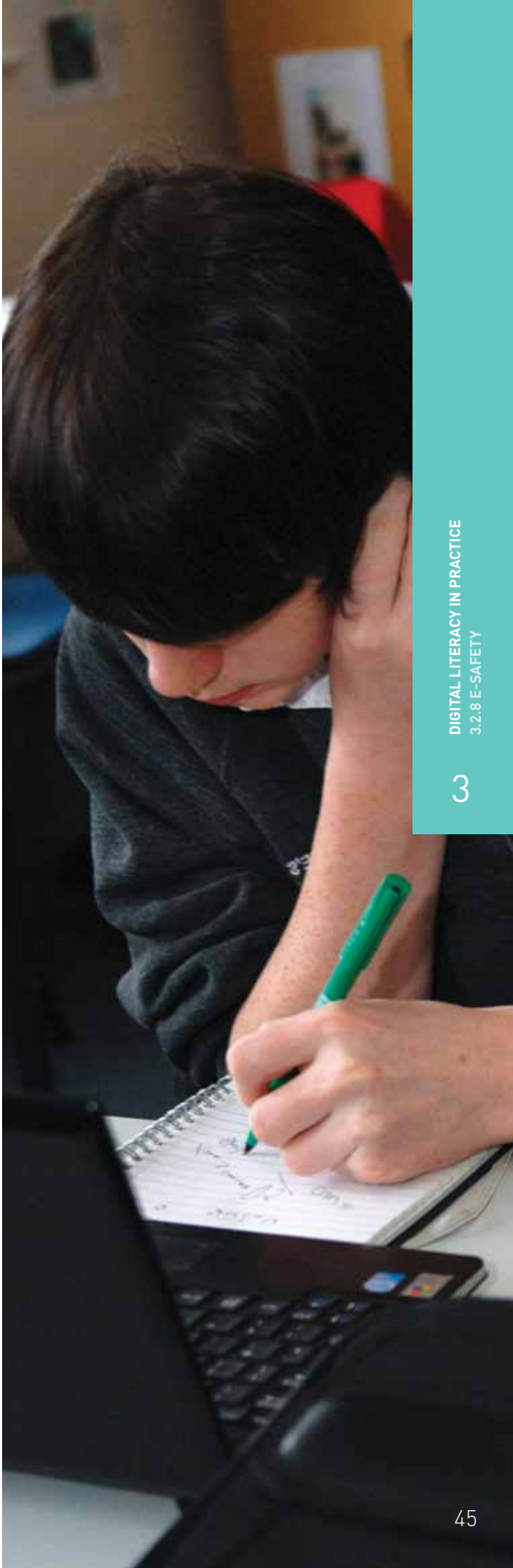
There is a vast array of information already existing out there to support teachers and learners to think about safety in relation to digital technologies. These include:

Becta provides guidance and information to schools on e-safety.
www.nextgenerationlearning.org.uk/safeguarding

The Thinkuknow website – provides resources for students, teachers and parents covering a range of e-safety issues.
www.thinkuknow.co.uk

Teachtoday provides information and advice for teachers, head teachers, governors and other members of the school workforce about the positive, responsible and safe use of new technologies.
www.teachtoday.eu/en.aspx

Know IT all: "A suite of education resources designed to help educate parents, teachers and young people about safe and positive use of the internet."
www.childnet-int.org/kia/primary/smartadventure/default.aspx



61. Click Clever, Click Safe, The first UK internet safety strategy. **publications.dcsf.gov.uk/eOrderingDownload/Click-Clever_Click-Safe.pdf**

3.3 BRINGING IT ALL TOGETHER: A PLANNING TOOL FOR DIGITAL LITERACY

The sections above have moved through a number of components of digital literacy and suggested some ways in which teachers might go about developing those components in the classroom.

How, though, can teachers bring all of the elements of digital literacy together in their subject teaching?

All of the aspects of digital literacy are already closely interlinked and developing one will often involve students making use of others. When students are successfully collaborating, for example, they are likely to be developing their communication skills simultaneously.

When students are thinking critically they can also be developing social and cultural understanding, thinking about how to communicate with particular audiences, and staying safe. When students are given the opportunity to use digital technologies for these tasks, they will need to think about how technology can be used well and they will practice and rehearse their functional skills.

The planning tool for digital literacy (see Figure 1.1) provides a process for teachers to go through in order to ensure that a particular task or project includes elements of the different components of digital literacy. It has been developed by Becta to address the lack of guidance on digital literacy. Teachers can use it to create their own plan for incorporating digital literacy in everyday lessons. The planning tool is supported by guidance and a range of resources for learners. These can be found on Becta's website at: schools.becta.org.uk/index.php?section=tl&catcode=ss_tl_dl_02

Digital literacy planning tool

Incorporating digital literacy into everyday teaching

This tool will help you incorporate digital literacy into your teaching – for any subject, at any level. You can use it as a planning tool for everything from a small problem-solving task to a larger project.

Click here to create your plan

There are five key aspects:

1. **DEFINING**
2. **FINDING**
3. **EVALUATING**
4. **CREATING**
5. **COMMUNICATING**

You can adapt the order to suit your teaching. You may not need to incorporate all five, or you may want to repeat stages.

Throughout the task or project encourage students to refine and improve their work, and when they have finished reflect on what went well and not so well. This includes their use of technology. They can then decide what they would do differently next time.

The questions for each aspect are those that learners should consider. Use them as a handy reminder.

Figure 1.1 Becta's planning tool for digital literacy

The framework suggests that teachers ask students to go through a process which involves students defining a task, question or activity and finding information to help them answer the question or complete the task. They need to evaluate and analyse the information they have found, synthesize it with their already existing knowledge and re-contextualise it in order to create an argument or come to a new understanding about the subject. Students are asked to create an output which will help them communicate what they have learnt.

As students progress through the process, they will need to reflect on what they have been doing and what they have been learning. It may not always be a linear process and may involve students returning to each stage to refine their task or activity or to re-evaluate information. They may be communicating or creating at any stage of the process and will need to critically engage with their task throughout. The hexagons in Figure 1.1 contain questions to be addressed at each stage of the process and more information about some of the issues that need to be considered can be found below:

Define – Depending on the teacher's aims and aspirations for a particular topic, they may need to give students more or less input when defining a task, activity or question. Where students are fully involved in this process, this means that students will need to draw on their pre-existing knowledge of a topic in such a way as to phrase a question or identify a problem related to that topic. This may involve the teacher encouraging students to shape, clarify, define or focus their initial ideas and plans in order to end up with a realistic plan for a piece of work. Students may also need to think about what they will need to find out, who their audience will be and what resources they need.

Find – This involves students developing their research skills. Where students are using the internet for research, they may need some help in learning how to ensure the information they are using is reliable. Some teachers give out tips for good research and it can also be useful to provide students with some examples of websites which contain reliable information and to remind them that they need to re-contextualise, re-purpose and rephrase the information they find on the internet – not just copy and paste it into their own work.

Evaluate – Students need to engage their critical thinking skills to understand, analyse and evaluate the arguments they encounter and to create their own arguments related to a particular topic or subject. They need to think carefully about the reliability and relevance of information they find online and they need to evaluate the way in which information is presented as well as using their evaluative skills to inform how they re-contextualise that information in a way that supports the claims they plan to make with it.

Create – This involves students thinking creatively and creating an output or artefact which reflects and conveys what they have learned. They will need to consider the purpose of their piece and the needs of their audience and make careful and informed decisions about what format and medium to use and how to present the information they are using.

Communicate – During this process students will need to communicate with each other, with their teacher and potentially with a number of other audiences. They will need to think about what constitutes effective communication for different audiences.

Each of the components of digital literacy referred to in this handbook can be fostered through the use of this framework; the framework can be used to plan for activities that develop collaboration, communication, creativity, critical thought, social and cultural understanding, research skills, e-safety and functional skills.

Using the framework

> "I used Becta's Digital Literacy Planning Tool to provide prompt questions... questions like: Is your chosen technology helping or hindering you in meeting your project objectives? How are you developing and refining the information you gather? Why is this important? What have you learnt today and how can you take this forward?" Secondary geography teacher

The framework can be used to support planning for digital literacy development in the classroom. It is designed to be flexible and you can adapt it to suit your teaching.

Think of an area of learning you currently teach. How could you incorporate an element of digital literacy into it? What opportunities exist to use this framework as a planning tool? Would it be useful as it is or would you want to adapt it in any way? What would you and your students do at each stage of the process?

The framework suggests that as students develop their digital literacy they will increase in confidence and independence. To achieve this, teachers may use different teaching styles at different times, depending on the activity set and their aims and objectives for a particular piece of work. These different pedagogical approaches involve teachers either:

- directing the activity and specifying the outcome, or
- guiding learners, allowing them choice at certain stages, or
- facilitating learners in choosing their own question or solution.

This is not necessarily a strict progression; teachers will find that, depending on the task and their student's digital literacy development they may need to move between teaching styles. For example, in a piece of work that sees students researching information and re-contextualising that information into a short film for a peer audience, students who have previously had a lot of direct teaching in finding and selecting information, may be fairly independent in the research aspect of their project. However, if they have never made such a film before, they may need more direct teaching and support in critically thinking about how to communicate their chosen message.

It is also important to note that all of the above teaching styles require teachers to take an active role. Even when not directing the learning, teachers are actively supporting students through critical questioning and prompting.

Teachers may find this framework to be highly useful in planning and approaching what can appear to be a complex topic. It is not, however, the only way to support the development of young people's critical digital literacy. Teachers are the experts about what will support their own practice and should adapt such frameworks to their needs.

3.4 THINKING ABOUT PROGRESSION AND ASSESSMENT

How do you measure digital literacy? How do you know if your students are progressing?

Although thinking about progression and assessment can be one of the most difficult aspects of developing an approach to digital literacy, it is helpful to think of digital literacy as something to be characterised rather than measured. This means that if, for example, you can characterise what good collaboration looks like, what creative ability looks like and what effective critical thinking involves, then it is possible to assess critical digital literacy.

Most practitioners have extensive experience of evaluating how effectively students engage in critical thought or use particular tools, how they collaborate together or how they communicate with others, and so on. In many circumstances the same assessment criteria and attainment levels will be applicable whether or not a piece of work makes use of digital technology; digital literacy can be viewed as an added dimension of subject knowledge and assessed accordingly. In other circumstances, questions will remain about how to assess digital literacy either discretely or in terms of how it adds to subject knowledge. How, then, can existing methods be adapted and used to assess progression in digital literacy as a whole?

Progression

We have seen how learners progress in their digital literacy as they become increasingly independent and when they move from requiring a high level of support and guidance from the teacher to being able to take responsibility for their own learning experiences.

> "In a general sense, a production project with young children is the same as such a project with 16 year-olds... The shape of progression is, then, the repetition of such work over and over again... Whatever it is that changes as students move through the years can be better seen expansion rather than addition: expansion of concepts, of meta language, of media forms, of cultural purposes and cultural horizons." [62]

Progression is not a linear process whereby students begin with absolutely no exposure to the skills of digital literacy. Research suggests that even the youngest students will often already have some understanding of digital technologies and can learn from their interactions from them.[63] Instead progression involves increasing ability to deal with complex ideas and subject knowledge and growing sophistication of evaluation, analysis and final outputs, as well as an increasing ability to reflect on learning and a developing independence.

62. Burn, A and Durran, J (2007). Media Literacy in Schools: Practice, production and progression: Paul Chapman Publishing: 152
63. Willett, R, Robinson, M and Marsh, J (eds) (2008). Play, Creativity and Digital Cultures. London: Routledge; Eagle, S et al (2008). From Research to Design: Perspectives on early years and digital technologies. Futurelab.

Assessment and evaluation

Peer assessment and self evaluation can be helpful in assessing digital literacy. Student assessment gives learners a voice and allows them to participate in their own assessment. This can be an effective way in which to encourage reflection.

One teacher who has written widely on multimedia projects in the classroom has suggested that variations on some of the following questions can be used for student self-evaluation as appropriate:

_ How did you plan your project/piece of work?

_ What research did you do to inform your project/piece of work?

_ What help did you need and who did you get the most help from?

_ What two things did you most enjoy about this project? How well did your group work together?

_ What was the most difficult part?

_ How did you feel about using this technology (confident, not confident etc)?

_ What facts or ideas really stick in your mind from this project?

_ If you were creating something, did you think about who was going to use the piece after you made it? If yes, who was the intended audience? What did you have to take into consideration when thinking about this audience?

_ What ideas were you trying to get across and how did you do that? How did the audience respond?

_ Was the information you used correct and how do you know that it was correct?

_ What did you not enjoy about this project?

_ Would you like to do a project like this again? What would you change next time?

_ Any other comments? [64]

Where student assessment is used, teacher assessment should involve the same criteria. This means teachers need to consider, for example, whether students have been able to research from relevant and reliable sources and whether they have been able to adapt information to the audience and communicate the subject matter from their own point of view.[65]

In practice

Northwest Learning Grid online resource focuses on the knowledge and skills related to accessing, understanding and evaluating digital information: www.nwlg.org/digitalliteracy. As the teacher notes explain:

> "Learners enter the resource by selecting an activity where they already use the internet such as chatting to friends, shopping or doing homework. They are then encouraged to question their knowledge, understanding and behaviours through the use of a magazine style quiz that provides them with feedback on their internet 'personality'. Learners then select areas for further investigation. Each area provides them with information that challenges their assumptions and then allows the learner to test and practice their understanding through a game."

www.nwlg.org/digitalliteracy/teachernotes.html

Becta are producing a learner checklist, designed to be used by students themselves as a self evaluation of their digital literacy. Separate checklists for both primary and Key Stage 3 students are forthcoming and will be made available on the digital literacy area of the Becta website: schools.becta.org.uk/index.php?section=tl&catcode=ss_tl_dl_02

64. Lachs, V (2000). Making Multimedia in the Classroom: A teacher's guide: Routledge Farmer: 130-142

65. Lachs, V (2000). Making Multimedia in the Classroom: A teacher's guide: Routledge Farmer: 142

3.5 PEDAGOGY AND CONTINUING PROFESSIONAL DEVELOPMENT

Developing processes for supporting students' digital literacy provides the potential for teachers and students to design new, stimulating, collaborative and creative classroom experiences that connect with young people's lives and help them to become critical, independent learners.

However, it is important to recognise that this has implications for teachers' practice. Drawing on the experiences of teachers on the digital participation project, this section highlights some of the pedagogical considerations involved in developing digital literacy and the implications for teacher professional development (CPD).

Digital literacy, knowledge and understanding amongst teachers

Over the past decade teachers have been increasingly encouraged to embed ICT into their subject teaching. However, although many teachers will have heard the term 'digital literacy,' unless they are provided with more detailed information, they may remain unsure what it means for their students and for their teaching and indeed, in some cases, what it has to do with them.

Digital literacy discussions are increasingly moving from the sphere of educational research into the sphere of practice and this handbook, along with the texts referenced within it and Becta's recently published digital literacy materials, aim to support the link between these two spheres.

Any CPD around digital literacy should not only allow teachers to explore the concepts of digital literacy but also to consider what it means for their own practice. As this handbook has stressed, digital literacy can support the development of subject knowledge by providing students with a number of resources that enable them to become critical, discerning, creative learners who can re-contextualise and communicate information effectively.

However, the reality of the environment in which teachers are working needs to be acknowledged. For example, many are under great pressure to achieve exam results and therefore position themselves as deliverers of the curriculum or syllabus content even when a less didactic method of teaching resonates more with their personal values and their aspirations for their students. Teacher CPD therefore, needs to support practitioners to understand the ways in which digital literacy can contribute to their students' development of subject knowledge and what digital literacy means for them in their teaching.

On the digital participation project, following two participatory workshops exploring the concepts of digital literacy, teachers were encouraged to compose a definition of digital literacy that resonated with their own professional values.

> "Giving learners tools to access their digital surroundings, and the abilities to do that so they're not disadvantaged. Giving them the critical awareness of technology as well, giving them a frame of reference to be able to unpick it empowering them and enabling them to make informed decisions in an increasingly digitised world." Secondary teacher involved in the digital participation project

Teacher confidence and expertise

Research suggests that some teachers may experience a lack of confidence in relation to their use of ICT in the classroom and may also find that they do not have the technical support or time to allow them to rectify this.[66]

This has been extenuated by some unhelpful myths that have perpetuated over the past decade. The first is that young people are digital natives with a far greater understanding of digital technologies that of their teachers. As is discussed elsewhere in this document, it is increasingly being recognised that this is not necessarily the case; competence in young technology users does not automatically equal confidence.

In addition, it has been purported by enthusiasts that technology itself can transform learning, that it can engage and inspire young people, the implication being that it does so more than their teachers. Technology in and of itself cannot transform learning, it is the practices that surround the use of technology in the classroom that is key to the learning outcomes.

66. Daly, C, Pachler, N and Pelletier, C (2009). Continuing Professional Development in ICT for Teachers: A literature review. WLE Centre, Institute of Education, University of London. Becta.

In considering any professional development in digital literacy, acknowledging teachers' professionalism and existing pedagogical skills is vital to redress these myths.

Teachers need to be supported to understand how to apply their expertise to the digital technologies in their classroom and to the process of fostering digital literacy. A history teacher, for example, may be expert in encouraging his students to think critically about the veracity and contexts of texts from the past, but may not have considered using those pedagogical techniques to foster critical thinking in relation to information found on the internet.

In considering how to apply their skills to the digital world, teachers should be encouraged to reflect on their own digital literacy. They can also explore for themselves and with their students the opportunities and new ways of teaching and learning that can support and be supported by digital literacy.

Pedagogy and classroom relationships

Developing digital literacy in the classroom sees students becoming more independent in their learning. As they are supported to find and select information for themselves, to communicate their learning, to express their creativity and to think critically about the affordances of digital technology, students are recast from passive recipients of information to active meaning-makers, working with their teachers to codesign and personalise their learning.[67]

Supporting learners to become active constructors of subject knowledge in the classroom suggests a different role for teachers than that associated with more didactic pedagogies in which information is required to be transmitted to the students. It requires new classroom relationships and new understandings.

Teachers have variously described this role as guide, mentor and facilitator. Far from being a passive role, though, it requires teachers to be active and reactive, to support, to prompt, to question and to continue to scaffold learning through a range of critical teaching practices that foster an atmosphere of questioning and debate.

Most importantly, this approach requires reflective practice; practitioners will need to constantly evaluate the impact of their own pedagogical approaches and choices on their learners.[68]

This is a type of pedagogy that also challenges some of the traditional means of classroom control. For some teachers control of behaviour is closely related to control of classroom space. The mobile nature of some technologies together with the collaborative and creative activities students might undertake with them, necessarily require students to be moving around rather than sitting at desks. Students and teachers will be making different uses of classroom space, for teachers who have come to equate students being seated with their control of the classroom, this can potentially be unsettling at first.

> "It's a different relationship, you need to build trust with them and give them more freedom. But it is through that new relationship that you begin to realise what they're really capable of." Primary school teacher

As well as presenting more opportunities for independent learning, fostering digital literacy can make connections between school and students' out of school experiences. This may require teachers to move beyond a focus on curriculum content to locating different kinds of resources and engaging with students' lives and cultures outside of school.

> "Students are able to draw on a much wider range of learning experiences, they can bring in their home learning, they can bring in their own interests, they appreciate an open brief and supported in that, they appreciate the learning experience, they are engaged with content" Key Stage 3 geography teacher

In order to support teachers in developing these practices any professional development activities and indeed schools' senior management teams need to provide time for teachers to develop their techniques in an atmosphere that encourages them to try out new pedagogical approaches. Providing time for teachers to engage with changing practices and to connect with other practitioners to share ideas and experiences has been shown to be essential in ensuring lasting change.[69]

67. Hargreaves, D (2005). Personalising Learning 3: Learning to learn the new technologies. London: Specialist Schools Trust. **www.sst-inet.com.au/files/David_Hargreaves_-_Personalising_Learning_3_-_Learning_to_Learn.pdf**

68. Beetham, H and Sharpe, R (2007). Rethinking Pedagogy for a Digital Age: Designing and delivering e-learning. London and New York: Routledge: 3

69. Thomson, P (2007). Whole School Change – A review of the literature. London: Creative Partnerships. **www.creative-partnerships.com/data/files/whole-school-change-14.pdf**

Vital CPD

In January 2010 the Open University launched its innovative new professional development programme for teachers, Vital.

Vital aims to inspire and support teachers to understand the potential of digital technologies for learning with a mission to develop the use of ICT both within ICT subject teaching and across all subjects of the curriculum.

The programme offers face-to-face and online courses and has been designed with an online community at its heart which will enable practitioners to share information and good practice.

"All of Vital's courses are built around a practitioner research cycle and include planning, implementing and reflecting on practical activities in the school/classroom."

For more information:
www.vital.ac.uk
www.twitter.com/vitalcpd

Teachers supporting teachers: Using digital technologies to share ideas

The internet and Web 2.0 technologies not only provide great opportunities for the classroom, they are also great sources of tips and support for teachers and can just give teachers a feel for what digital technologies are 'out there', being used by other practitioners.

Recent years have seen the development of a number of social communities of teachers keen to share their interest in developing the use of digital technologies.

For example, there are a number of teachers from a range of subjects and Key Stages who share their experience of digital technology in the classroom via blogs.

One teacher set up a Wallwisher page on which he invited teachers to post virtual sticky notes about Web 2.0 tools for teachers: www.wallwisher.com/wall/teachersweb20 (NB. this Wallwisher was originally set up for teachers of English as a foreign language but the tools could be used in any classroom)

The Microsoft Partners in Learning Network is a global community of teachers that features discussions about the use of digital technologies in the classroom and provides links to free tools. uk.partnersinlearningnetwork.com/Pages/default.aspx

Twitter has an active, global community of teachers who regularly share their experiences of using digital technology in the classroom as well as links to articles & blog entries that have interested them and links to free digital tools. This is useful because it allows teachers to learn about and reflect on the practices and the contexts that surround technology use in the classroom rather than just considering the digital tools themselves.

If you're new to Twitter and would like to try it out, you could start by visiting Futurelab's Twitter page twitter.com/futurelabedu. There you will find some 'lists' of the teachers @futurelabedu 'follows'. Click on some of them, if you find people who you think have something interesting to say, you can sign up for a free Twitter account and start 'following' them for yourself.

3.6 DIGITAL LITERACY AT A WHOLE-SCHOOL LEVEL

A school's approach to digital literacy may develop from small beginnings – it may begin with one teacher's focus on digital literacy in their own teaching. Ideally, the aim should be to move towards a coherent whole-school programme for digital literacy across the curriculum.

What, then, are the factors underpinning a successful whole-school approach to digital participation?

This may involve:

- a shared, coherent and broad understanding of digital literacy across the school
- a participatory ethos
- strong senior management support and a culture where staff feel that they can safely experiment with their teaching practices
- an emphasis on ongoing reflection, planning and reviewing
- staff development
- a commitment to ICT resources as well as to making the best use of freely available web-based tools
- the possibility of having some degree of flexibility around planning the time and location of lessons.[70]

It is also the case that fostering digital literacy in school subjects can support and complement the implementation of other whole-school initiatives and curriculum requirements.

In the digital participation project, for example, a secondary science teacher found that in addition to supporting his students to become digitally literate subject specialists he was also able to address a whole-school focus on communication skills.

Student participation: Creating a digital prospectus

Year 5 and 6 students at Knowle Park Primary School in Bristol and their teachers Andy Dewey and Joe Tett, were given the responsibility for producing the school's new prospectus, which for the first time was to be in digital format and made available as a DVD.

This cross-curricular, collaborative piece of work saw the children working to draw on their own experiences and opinions of their school to create short film clips to promote and explain the different aspects of school life that they thought would be useful to potential future parents and children of the school.

Each group of five or six children of mixed ability and age, were made responsible for the content of a certain section of the prospectus.

> "We need to make sure that in the background is something that we think represents our school."

Year 5 student explaining why the group had decided to film each other speaking in front of a certain display in the school hall.

Supported by their teacher with questioning such as "what will that mean to the parents and children who will watch the DVD at home?" the students carefully planned what to film and what to say.

They had a clear vision of what they wanted to create. They wanted it to be informative and entertaining. They were also keen to express their pride in their school and to tell others why they should join Knowle Park.

www.knowlepark-pri.bristol.sch.uk

70. Lachs, V (2000). Making Multimedia in the Classroom: A teacher's guide: Routledge Farmer: 7

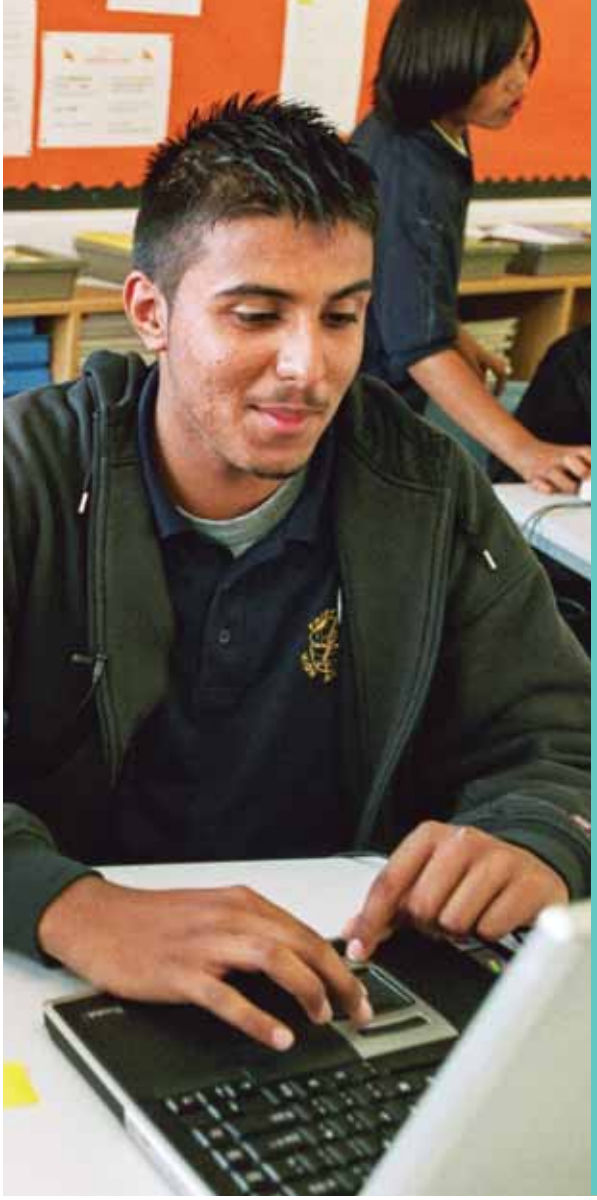
Other teachers found that synergies existed with the secondary National Curriculum's personal learning and thinking skills framework.

> "As a teacher I've found that digital literacy can be fostered alongside teaching subject content and within other critical skills frameworks like the PLTS. I found Becta's Digital Literacy Tool fitted nicely alongside the personal learning and thinking skills framework which my students were already familiar with– the define, find, evaluate, create, communicate structure really helped develop the students' independent enquiry, reflective learning, creative thinking and effective participation."
> Secondary geography teacher

Many schools may find that a focus on digital literacy can also support policies on student voice. The development of digital literacy can create opportunities for young people to shape their own opportunities for expressing their thoughts, ideas and opinions. It is now commonplace for most primary and secondary schools to have policies on student or learner voice and to have mechanisms such as a student council through which these voices are heard. Digital technologies can be a very effective tool for fostering student voice in a way which can also function to support students' digital literacy. This could range from students using handheld technologies to observe teaching practice to the use of discussion forums where students can put forward their point of view on a particular topic of relevance either at a whole-school level or within a particular classroom.

Digital literacy can contribute to whole-school initiatives as well as supporting the development of subject knowledge in individual teachers' classrooms. As a whole-school approach, a commitment to digital literacy can enable schools to support students in making the most of the opportunities associated with digital technologies, to develop young people's critical thinking and creativity and to engage with their lives in a way that has the potential to make their learning more relevant.

4. SUMMARY



This handbook discusses the meaning of digital literacy and suggests it should be understood as a wide-ranging set of practices that enable students to create, share and understand meaning and knowledge in an increasingly digital age.

It positions digital literacy as an important entitlement for children and young people and outlines the ways in which the practices of digital literacy can support their full participation in a society in which social, cultural, political and financial life are increasingly mediated by digital technologies.

The handbook highlights the important role of schools in developing digital literacy and furthermore indicates how digital literacy can support both National Curriculum aims and a school's own educational ethos and values.

Based on Futurelab's digital participation project, in which researchers worked alongside teachers to explore the possibilities of fostering digital literacy within curriculum teaching, the handbook argues that digital literacy can be developed alongside subject knowledge in all classrooms at both primary and secondary level.

It contends that digital literacy can be important not only in supporting students to become independent, critical learners but also in narrowing the gap between children's lived experiences inside and outside of school.

The handbook offers teachers practical ideas and support for developing the components of digital literacy in their teaching. Whilst acknowledging that further exploration of how to put digital literacy into practice is still needed, this handbook aims to provide a useful starting point that examines the issues and inspires individual practitioners and school leaders alike to begin to develop their own approach to supporting students' digital literacy in the classroom.

About Futurelab

Futurelab is an independent not-for-profit organisation that is dedicated to transforming teaching and learning, making it more relevant and engaging to 21st century learners through the use of innovative practice and technology. We have a long track record of researching and demonstrating innovative uses of technology and aim to support systemic change in education – and we are uniquely placed to bring together those with an interest in improving education from the policy, industry, research and practice communities to do this. Futurelab cannot do this work on its own. We rely on funding and partners from across the education community – policy, practice, local government, research and industry - to realise the full potential of our ideas, and so continue to create systemic change in education to benefit all learners.

Also from Futurelab

Literature Reviews and Research Reports
Written by leading academics, these publications provide comprehensive surveys of research and practice in a range of different fields.

Handbooks
Drawing on Futurelab's in-house R&D programme as well as projects from around the world, these handbooks offer practical advice and guidance to support the design and development of new approaches to education.

Opening Education Series
Focusing on emergent ideas in education and technology, this series of publications opens up new areas for debate and discussion.

About Becta

Becta is the government agency leading the national drive to ensure the effective and innovative use of technology throughout learning. It is our ambition to utilise the benefits of technology to create a more exciting, rewarding and successful experience for learners of all ages and abilities, enabling them to achieve their potential. We do this in many ways. We make sure the right technology is available, we influence the development of policy, and we set standards and provide tools that help establish and promote best practice. We know that technology has the potential to transform learning. We are committed to inspiring education providers to realise that potential, and equip learners for Britain's future success.

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This handbook and accompanying case studies are available to download free of charge from **www.futurelab.org.uk/projects/digital-participation**.