



Digital Literacies

T·L·R·P
Technology Enhanced Learning

A Research Briefing by the Technology Enhanced Learning phase of the Teaching and Learning Research Programme

Julia Gillen and David Barton

Digital Literacies

A Research Briefing by the Technology Enhanced Learning phase of the Teaching and Learning Research Programme



RICHARD NOSS
*Director: TLRP –
Technology Enhanced
Learning*

Preface

At all levels our education system is seeing the need to change to meet the exciting challenges of a rapidly evolving, increasingly digital society. Questions of how to define and develop digital literacies are topical. This research briefing offers a contribution to the discussion from the vantage point of the Technology Enhanced Learning phase of the Teaching and Learning Research Programme (TLRP-TEL).

This four-year phase was launched in 2007 and comprises eight interdisciplinary projects with funding of around £12 million. We are grateful to two research councils for this support – the Economic and Social Research Council and the Engineering and Physical Sciences Research Council.

In this programme, educators and technologists collaborate to ask how teaching and learning might be made more effective with judicious design of technology, and how technology might impinge on what is taught and to whom. At the heart of each TLRP-TEL project is a central research challenge: to understand what meanings our learners are creating for themselves as they engage with the artefacts we develop. It is more or less clear that attempting this challenge by drawing any simple correspondence between learning with and without digital technologies just won't work: people with digital technologies have new things to say, and new ways of saying them. The implications for interdisciplinary design and evaluative methodologies are complex. This research briefing, the second in the series, contributes to unravelling this complexity.

A handwritten signature in black ink, appearing to be 'Richard Noss'.

Richard Noss
Director: TLRP-Technology Enhanced Learning

Contents



Introduction	4
The profound shift of digital literacies	6
Situated practices	8
Evolving social practices and key challenges for education	9
Key characteristics of developing digital literacies	11
Conclusions: challenges in working towards a holistic understanding of what it means to work to develop digital literacies	19
Response: Contextualising Digital Literacies	22
References	27

Julia Gillen and David Barton
*Literacy Research Centre,
Lancaster University*

With contributions by:
Gunther Kress
Fred Garnett

With grateful thanks to TLRP-TEL projects:
ECHOES
ENSEMBLE
hapTEL
Inter-Life
LDSE
MiGen
Personal Inquiry
SynergyNet



Digital literacies: introduction

The concept of digital literacies is fascinating both in its definition and its application. The term captures an arena of rapidly developing practices, as humans interact with technologies in new ways and for innovative purposes. Many time-honoured distinctions such as between producer and consumer, writer and reader blur or virtually disappear as new syntheses emerge. There are a number of valuable approaches to digital literacies that overlap with one another. Rather than look for clear distinctions to demarcate them, it is perhaps more helpful to look for continuities and commonalities. Differences stem from their origins and the purposes for which they were conceived, or are currently used. We begin by examining earlier approaches to the concept that continue to have useful influence.

Commentators tracing the evolution of the term digital literacies often begin by citing approaches to the term that focus on skills, arguing that these are narrowly conceived (see for example Lankshear and Knobel, 2008). A focus on individuals' skills and competencies relates clearly to the original and persisting requirements for qualifications and skills required by the ICT industries. As computers increasingly permeated the economy, with small cohorts of people able to deal with or understand them, bachelors' and masters' degrees in computer science and related fields grew. Increasingly, providers of hardware and software developed their own systems of qualification, since often for employers, specialisation is vital, measured in certification of the individual's capacities to achieve specific tasks and solve certain kinds of definable problems. More general qualification structures appertaining to formal education can demand a broader overview but suffer from a problem of quickly outdated. Qualifications in ICT, at for example GCSE and 'A' level persist, despite widespread recognition that in some respect subject content is inevitably out of date as it takes time to develop quality standards and to design curricula. But as long as highly skilled, specialist individuals are required in the workplace then individually-based assessments will continue at some scale.

Concepts of digital literacy were introduced as it became necessary to consider the skills and competencies of those on the receiving end of the products of the ICT industries. Digital literacy brought in 'softer' skills concerned with making judgements and even criticality. An initial often cited attempt at defining digital literacy (Gilster, 1997) identified four key competencies: assembling knowledge, evaluating information, searching and navigating in non-linear routes.

With modifications, this emphasis on the skillset of the individual has continued in many sources (e.g. Jones-Kavalier and Flannigan, 2006; Partnership for 21st Century Skills, 2009). The notion of the informed and skilled individual remains particularly salient where adequate access to digital technologies remains a vital issue to be overcome. In the United States, the American Recovery and Reinvestment Act of 2009 made available huge resources for a Broadband Technology Opportunities Program, recognising the necessity to improve access for a wide range of purposes. The summary statement of purposes (American Recovery and Reinvestment Act, 2009: HR1 398-399) focuses primarily on stimuli to the economy at a time of recession and broadening opportunities for formal and informal learning. Nevertheless, the plan also makes reference to less tangible social issues such as mitigating against rural social isolation.

The program makes plain the wide range of functions which digital technologies make possible, especially where delivered by wireless or broadband. As digital technologies have spread, matured and developed, more people are participating in the creation and collaboration that have become characteristic of the Web 2.0 wave. Approaches to digital literacies have developed alongside the

application of technologies (Coiro, Knobel, Lankshear & Leu, 2008). The distinction between software engineering and the use of “applications” has become more blurred as so many more users have become actively engaged in the creation of applications – as with iTunes, Facebook, GPS on mobile phones, Flashmedia, etc. Distinctions between ‘programmer’ and ‘user’, between ‘producer’ and ‘consumer’ and, as will be discussed below, between ‘writer’ and ‘reader’ blur or dissolve in a process of convergence.

Human judgment, or criticality, is involved in most understandings of digital literacies and at the centre of the concept of ‘multiliteracies’. One influential and useful endeavour to connect conceptions of what pedagogy should be with new social realities including technological developments was proposed by the ‘New London Group’ in 2000.

The summary quoted in Figure 1 has certain strengths. The first emphasis on ‘situated practice’ reinforces the notion that learning is always connected to specific domains of activity– the settings, participants, discourses and dynamics of participation (Lave and Wenger, 1991). Of course, people may make connections between experiences even if the borders between domains seem to be highly demarcated, as, for example, with home and school; this issue will be addressed later. The second emphasis is on the place of ‘overt instruction’ making the sensible point that however learner-centred a philosophy of education may be, however informal learning might become, teaching is essential in the imparting of useful frameworks for thinking and understanding, that are developed in processes of social interaction (Wegerif, Mercer & Dawes, 1999). The notion of “Design” encompasses a richer understanding of semiotic modes rather than ‘authoring’. The New London Group’s conception of ‘critical framing’ recognises the importance of power relationships in communication and that they are rarely symmetrical. The notion of ‘transformed practice’ recognises an aspiration that students remain not merely recipients of validated frameworks of knowledge transmitted to them, but rather that they become active, informed and skilled citizens who can make effective contributions to their social worlds.

Figure 1 *The Four components of pedagogy proposed by the New London Group*

- **Situated Practice**, which draws on the experience of meaning-making in everyday life, the public realm and workplaces;
- **Overt Instruction**, through which students develop an explicit metalanguage of design;
- **Critical Framing**, which interprets the social context and purpose of Designs of meaning; and
- **Transformed Practice**, in which students, as meaning -makers, become designers of social futures.

(Cope and Kalantzis, 2000, p. 7)

At the heart of multiliteracies then is a concept of ‘Design’ elaborated in the work of Gunther Kress, as presented below. Kress offers an extremely fruitful approach to digital literacies, in his synthesis of arguments that considers such factors as (i) the rapid evolution of digital technologies; (ii) a new more pervasive emphasis on multimodality in digital communications; (iii) consequently, a new approach to communication and interaction that is best characterised by an emphasis on design rather than a highly separable distinction between ‘writing’ and ‘reading’.

The profound shift of digital literacies

Gunther Kress

A revolution in communication

My interest is meaning-making in communication. Communication is a social activity, and as such it is embedded in the wider social environment. That environment is marked by great instability, so that communication is becoming ever more problematic. Digital literacies are in a deep and profound sense new literacies, not merely the traditional concept of literacy – reading and writing – carried on in new media.

I wish to draw attention to the radically changing forms and functions of texts, which go beyond traditional conceptions of what literacy is and has been. I consider productive aspects to be at least as significant as receptive – text-making as important as text-receiving – though I also suggest that distinction is increasingly challenged in the environment of digital technologies.

In the current period writing is being affected by four factors:

- 1) Texts are becoming intensely multimodal, that is, image is ever-increasingly appearing with writing, and, in many domains of communication, displacing writing where it had previously been dominant.
- 2) Screens (of the digital media) are replacing the page and the book as the dominant media.
- 3) Social structures and social relations are undergoing fundamental changes, as far as writing is concerned, predominantly in changes of structures of authority, and in the effects of changing gender formations.
- 4) Constellations of mode and medium are being transformed. The medium of the book and the mode of writing had formed a centuries-long symbiotic constellation; this is being displaced by a new constellation of medium of the screen and mode of image. The consequences of this shift are profound.

The effect of these four together amount to a revolution in the world of communication.

Multimodality

Contemporary texts are becoming ever more multimodal, that is, they combine writing and image (on screen or page); writing, image, moving image, music and speech (on a DVD, on a website); or gesture, speech, image, spatial position (in f2f interaction). This requires that we think newly about reading and writing, but also that we think about the meaning-contribution of all other modes that appear in texts. We can no longer treat image as merely decorative, or even just as 'illustration': images are now being used to make meaning just as much – though in different ways – as is writing.

The increased use of images is not making texts simpler, as is often claimed. Multimodal texts demand new ways of reading: the meaning of each mode present in the (multimodal) text has to be understood separately, and its meaning conjoined with all others that are present, and brought into a single coherent reading. The demands on writing have both changed and multiplied. Socially, there is now (a recognition of) much greater cultural/social diversity and an expectation that this diversity is acknowledged. Writing now has to be considered in relation to audience, and in relation to the other modes which may be present in the textual ensemble, and their communicational functions. Writing is becoming part of a larger and encompassing design effort in the making of texts.

Design

The new environments are encouraging a new disposition towards making texts and towards reading texts. Readers, as indeed writers/designers, will now need to treat all features of the graphically presented text as meaningful. Where before their training had disposed them to attend to language in a much more abstract way – to grammar, words, syntax – now they need to attend to all features of a text. In other words their disposition has changed from a linguistic to a semiotic one.

Both the making of text and the reading of text demands much more attention to all possible means of making meaning. Design requires the apt use of all resources (modes, genres, syntax, font, layout, etc) appropriate to content and to audience. So, the facility offered by digital media shifts notions of making texts from 'using the available resource of writing in relation to my purposes and according to convention' to 'using apt resources for that which I wish to represent in order to implement the design that I have, given my understanding of the relevant characteristics of the social environment in which I am producing this text.'

It is relatively straightforward to see design in text-making; however design is also at work in text 'reception'. Where more traditional texts such as books have strict order at various levels, and given entry-points, multimodal texts, with their organisation on visual principles, and their multiple entry-points offer and even expect the reader to construct the order of reading for her/himself. In effect, reading the multimodal text makes readers into the designers of the texts they read.

Reading with digital media makes reading into an activity in which in many or most instances it is possible to change the text that I am reading as I read it. This changes the status of author and of text radically. In reading I can become author in a way which before had been possible only 'inwardly' (and in theory).

Implications

The use of screens by (young) people, and the implications of that use for pedagogies as well as for forms of writing, need to be fully understood. Screens encourage profoundly different approaches to reading than did the traditional page. The phenomenon of hyper-textuality chimes with larger social moves away from hierarchical and towards more lateral structures. A user of the screen who has several windows open at the same time – attending to chat, surfing the internet, listening to sound-as-music, is engaged in forms of 'attention' management entirely unlike the withdrawing, reflective modes of reading traditional written text, a mode still encouraged and rewarded in schools. The task will be to attend to both dispositions, bringing out, in ways plausible and relevant to young text-makers, the continuing value of each.

Those who have grown up in a world where the screen and its potentials have already become naturalized, are taking as natural all the potentials of the screen, including its social potentials and consequences – in terms of action, agency, modes to be used, modes which are focal, forms of production and reading. If the school remains (obliged to) adhere to the characteristics of the former semiotic and social world, there will be an increasingly vast gap of practice, understanding, and of disposition to knowledge.

Situated practices

Kress's semiotic approach brings together technological developments and human creativity in shaping outcomes. Socio-cultural approaches with an emphasis on people's practices locate this work in a broader framework. Edwin Hutchins' (1998) work on 'distributed cognition' is relevant here. Firmly contextualising his investigations in the development of technologised culture, he illustrates in detail how cognition in practice, that is as present in human activities, does not separate a person and their environment. He sees cognition as 'out there' as intrinsic to people's activities in relation to each other's activities and to the setting. This idea is present or at least emergent to socio-cultural approaches, including work on situated learning, on activity theory, and on literacy as social practice.

Taking as a field of investigation the practices of navigation on a contemporary ship for example, Hutchins shows how a single act of 'digital literacy' is founded upon a network of practices with sociohistorical antecedents and how it only has meaning if it has relation to others'

understandings and activities. The knowledge required to effect a change of direction in the ship's path, for example, is distributed among the instruments and number of actors required to effect the action. None of them can be effective alone, and all of them, humans and instruments alike, can only be understood in the context of the sociohistorical antecedents that make them comprehensible to others. No one person has the complete overview of the accomplishment of change of direction. Key to Hutchins' ideas, of relevance to the individual's knowledge and skillset is the notion of 'structured seeing'. Whatever we do, whether it is driving towards a roundabout and recognising the signs that have been developed through practices of generations of traffic engineers, dashing off a quick email on what seems a highly familiar template, or working with others to change the direction of a ship, relies upon our identifications of patterns in our highly technologised environment and our capacities to interpret and take action in the face of any challenge to expectations.

Hutchins' extremely detailed descriptions of practices are a particularly useful exemplar of what can be achieved by ethnographic approaches to technologised practices and they represent a methodological shift to paying increased attention to interactions with material culture (see also Vannini, 2009). That is, human practices are described in terms which make explicit the assumptions they are built upon and which recognise the historical basis of practices and detailed engagement with artefacts. Digital literacies are always dynamic – in part because technology is perceptibly developing so fast in front of our eyes – but also because human purposes continue to develop and are reshaped in collaboration. This is the moving backcloth for the current explosion of creativity in digital literacies that makes this such a fascinating arena in which to work, including in roles in computer science, engineering, education or the digital arts.



Evolving social practices and key challenges for education

Digital literacies as social practice

The ways in which we read and write, acquire and evaluate knowledge and communicate at all levels are changing (Leu et al., 2004). As Hague and Williamson (2009, p.3) point out, there are new “opportunities to participate in new kinds of social activities, civic life, learning and work.” In this section we argue for the benefits of drawing a broad view of digital literacies as social practice, before turning to the educational domain.

Drawing upon the frameworks outlined above, we propose as a definition of digital literacies: *the constantly changing practices through which people make traceable meanings using digital technologies*. Within this broad definition, specific aspects of digital literacies can be investigated and explored further, understood as in many ways offering a continuity to our understandings of literacies in general as social practice (Barton, 2007; Hague and Williamson, 2009). The distinctive contribution of the approach to literacy as social practice lies in the ways in which it involves careful and sensitive attention to what people do with texts, how they make sense of them and use them to further their own purposes in their own learning lives.

This social practice view of digital literacy possesses continuities with a social practice view of literacy in general. This is one which starts from what people do, the meanings they ascribe to their activities and the ways they use reading and writing in their broadest senses to achieve their purposes (Barton, 2007). Literacy studies using this approach have focussed on a set of topics that can provide valuable concepts when investigating new and rapidly changing practices.

Figure 2 Key concepts in literacy studies

- There can be different literacies in different domains of life.
- A focus on people’s everyday activities includes their vernacular ways of learning.
- Institutions are important in shaping, sponsoring and supporting people’s practices.
- Other people, in the form of brokers, mediators and scribes, can provide networks of support.
- Any literacy practice involves issues of access and power.
- Language exists alongside the visual and other modes in meaning making.
- Practices can move across domains of activity, changing their effects as they do so.

(adapted from Barton and Hamilton, 1998; Barton 2007)

Taken together, these concepts provide a powerful language of description for investigating digital literacies, applicable to all participants whether adopting the role of student or teacher in education or learner in one’s professional and/or everyday life. This approach to digital literacies reinforces the idea that we need multiple, rich methods to uncover the complexities of people’s interactions using digital technologies. The focus is on the ways in which people integrate new explorations and new tools into



their frameworks of experience and forward-oriented intentions. Thus, in educational contexts, overall a more appropriate stance towards the development of digital literacies than the 'overt instruction' element of pedagogy as given by the New London Group is an understanding of pedagogy as guidance to learn (Beetham and Sharpe, 2007). It is from this rich and multi-dimensional understanding of the complexities that are always associated with changes in social practices that we now turn to more explicit discussion of the educational domain.

Digital literacies, Web 2.0 and education

Education at all levels faces great opportunities and challenges in the face of rapid change. Indeed, we are in a period that could be characterised as fruitful turbulence in education as digital technologies create new social, cultural as well as cognitive affordances.

A significant site of mediation of digital literacy (as indeed traditional) literacy practices is, or should be, education, in all sectors. The earlier commentary by this programme, *Education 2.0? Designing the web for teaching and learning* (Selwyn, 2008) recognised this, reflecting that at the moment of publication Web 2.0 was best recognised as a reality: whereas education 2.0 remained an aspiration (Noss, 2008).

As is frequently noted, the emergence of the World Wide Web was a seismic shift in increasing access to vast amounts of information and enabling rapid communications. The term Web 2.0 is used to denote the proliferation of tools on the Internet that are allowing so many to become involved in collaboration, creativity, not least in finding various ways of representing and performing roles and identities. Rather than seeing these developments as a distinct break from earlier possibilities, Berners-Lee (1999), the Web's founder, points out that in essence its creation and take-up was a process of collaborative construction of new knowledge, or at least newly synthesised knowledge, enabled by making distanced multi-party communications so much quicker and easier than they had been before. So it can be argued that change towards Web 2.0 has been continuous rather than separable into two distinct periods (Leu, et al., 2009). Nevertheless, if one focuses on social practices, it is apparent that there have been great changes in the twenty-first century, with far more people becoming involved in online social networking and multiparty online communications, some directed towards the creation of online, persistent yet often unfinalisable artefacts of great diversity. It is this shift towards more diffused creative participation that is usefully denoted by Web 2.0.

The aspirational ideas of "Education 2.0?" captured the hopes of many educationalists that schools and other educational institutions could beneficially take up some of the key characteristics of Web 2.0. There has grown a recognition that lack of access to such opportunities confer active disadvantage (Digital Britain, 2009).

Digital participation is, in all sectors (Hague and Williamson, 2009; Beetham, McGill & Littlejohn, 2009), now coming to be regarded a positive entitlement. Education is of course a field of systematically shared priorities, policies and practices and so can be difficult to shift unless research-led evidence, top-down policy change and 'bottom-up' creative shifts instituted by teachers all combine as pressures for wholesale change. Change is hard especially when challenges are presented at the most material level, with technologies themselves let alone the practices around them seemingly in a constant state of flux.

Key characteristics of developing digital literacies

Digital literacies have been developed in many creative ways by educational projects. These will be outlined and illustrated with reference to TLRP-TEL projects. It is important to point out that the illustrations do not imply that this is the only way in which a specified project is or has contributed to the development of digital literacies, or that the TEL projects provide an exhaustive set of cases. Rather, our examples should be seen as an illustration of ways in which the research exemplifies a facet of developing digital literacies. The illustrations are intended to show interesting ways in which the development of digital literacies is exemplified in practice. In that spirit then, rather than suggesting they are in actuality distinct categories, we will present these under four headings:

Enhancing cognitive development and assessment practices through curriculum interventions that make use of new affordances of digital technologies.

Supporting learning communities to work collaboratively in problem solving and the co-construction of knowledge.

Working collaboratively in a multidisciplinary team to create useful, practical tools.

Increasing authenticity and overcoming access issues.

Before discussing these four aims and how they are flourishing, it is helpful to acknowledge that educational projects still have to recognise and cope with often stated fears about the impact of Web 2.0 (Baron, 2008). These include: fears that values of traditional education may be neglected; an uncritical valuing of superficial criteria such as popularity measured in 'hits' rather than the development of criticality and depth; and how teachers can cope in contexts where technology moves so fast they cannot always lay claim to expertise. While beyond our scope to deal with these issues in a thorough way, we will allude to some ways in which projects tackle such legitimate concerns and return to them in the conclusion.

A. Enhancing cognitive development and assessment practices through curriculum interventions that make use of new affordances of digital technologies.

MiGen

The appearances of new computational forms and literacies are pervading the social and economic lives of individuals and nations alike. Yet nowhere is this upheaval correspondingly represented in educational systems, in classrooms, or in school curricula. As far as mathematics is concerned, the massive changes to mathematics that characterise the late twentieth century—in terms of the way it is done, and what



counts as mathematics—are almost invisible in the classrooms of our schools and, to only a slightly lesser extent, our universities. (Kaput, Hoyles & Noss, 2002),

The MiGen team is building a pedagogical and technical environment to improve 11-14 year-old students' learning of mathematical generalisations. In doing so, it is tackling a difficult problem, that of the mathematical literacy known as algebra. Algebra emerged over a long period of time as a way to express generality – to talk and think about unknown quantities, express relationships between as-yet-unknowns. If we just consider the sentence “Let x be any number 3 more than y ”: there are all kinds of complexities that are challenging for children who routinely fail to see algebra as a way of analysing patterns and articulating structure, rather than a set of meaningless rituals.

The problem is that algebra – like calculus – emerged in the era of static representational systems; in our time, pencil and paper. In static systems there is not much choice – the individual who is trying to express generality has to conjure up a kind of mental virtual reality that sees the general in the particular; s/he has to think of x as representing an actual value, and at the same time, be aware that it could be any one of a (possibly infinite) set of values.

MiGen therefore faces a considerable design challenge: to find ways to express concepts which until the advent of digital technologies really could only be expressed via algebra. MiGen is trying to build a new mathematical literacy, a way of expressing generality that, for example, actually allows the learner to ‘keep an eye’ on the general, even as s/he interacts with the particular.

Ensemble

The Ensemble project (full name: ‘Semantic Technologies for the Enhancement of Case Based Learning’) is exploring the potential of semantic technologies to enhance teaching and learning in complex domains where collaborative work around a case, or cases, is an important pedagogical strategy. Complexity in this case means that learning outcomes are difficult to predict and are highly context-specific. The work of the project aligns with Kress’s semiotic approach to digital literacy with its emphasis on ‘tracing meaning’, ‘forward dialogue’ and ‘artefacts for new ways of thinking’. This is illustrated by two examples:

The first example is from field work. Ensemble is working with teachers and students to research and co-interpret the material and socio-cultural practices of learning with cases in settings ranging from Plant Sciences through Anthropology and Archaeology, International Journalism and Maritime Management. In small group work, where the students are required to articulate problems embedded in narrative cases, discussion is often bound up with material resources in the environment. For example, in a task about complex problems caused by working with legacy software, diagrams representing organisational structures become a shared visual reference that is edited and the meaning renegotiated as the group works towards a solution to the problem. Learners bring their previous experience of relevant cases to bear on problems and carry their knowledge of cases into other parts of the programme. Consequently the project team is working with teachers and students to develop online tools to support their engagement with specific problems and for reasoning across cases and course elements, thereby broadening the domains of activity, and hopefully changing their effects as they do so.

A second example involves the extension of an existing online resource: Edwardians: 'Family Life and Work Experience Before 1918', part of the ESRC Qualidata Archive (<http://www.esds.ac.uk/qualidata/>). The project has incorporated the metadata from this collection into a Mulgara semantic triplestore, an open source database (<http://www.mulgara.org/>), to allow new ways of accessing, manipulating and repurposing these data and aggregating them with those from other sources so that users can apply searches and filters within and beyond the original collection. Some features of the user interface functionality like searching and browsing are familiar, but the combination of access to heterogeneous data sources, metadata about relationships between people, places and events, and new forms of visualization enables new kinds of interaction for purposes that are not predefined, thus creating new curriculum interventions. Demonstrating this kind of application to teachers and learners also invites them to identify new opportunities in their own teaching and learning. The software application itself functions as a case with which to think about pedagogical opportunities and new technological affordances.

Figure 3: Using semantic tools to enhance an existing online archive of qualitative data



B. Supporting learning communities to work collaboratively in problem solving and the co-construction of knowledge

SynergyNet

The SynergyNet project team are developing a new form of multi-touch table for educational settings which has a large built-in surface that can detect contact from several people's hands or fingers at the same time. Unlike an interactive whiteboard, for example, a small group of four or five pupils can operate the table at the same time using gestures or movements with their fingers to select, move and re-size

tools, documents, photographs and videos on the table surface as part of a collaborative learning activity. In addition the project is also investigating the way that digital information can be moved around the classroom from table to table, or even projected on a wall from a table for demonstration, explanation and discussion. Pupils may create a piece of work on one table and pass it on to another group, simply by sliding it off the surface of their table in the direction of another group's work space for peer review. The receiving group might then comment, annotate or develop the material and then either circulate it further or return it to its creators. Such documents might take a range of forms, in terms of text and numbers, pictures and iconic representation, audio and video materials or even the creation of particular learning environments and simulations. The technology is thus relatively seamlessly integrated into the fabric of a classroom such that dialogue and pupil collaboration can be enhanced and extended. The appeal of the interface is that it can be controlled by different users working together simultaneously. The intuitive nature of the interface being developed using touch and gesture provides direct interaction physically and personally with the digital information displayed. This collaborative combination of multiple interactions is an instantiation of a new, collaborative literacy practice. Key challenges, from the point of view of digital literacies, are about the authorship of information (text, pictures, sound and video) so that the environment enables effective and intuitive creation, development and ownership of collaborative documents. In addition the role of the teacher in such an environment needs investigation to ensure learners are supported effectively in developing their learning through the evolution of an effective pedagogy for co-construction.

Figure 4: *The SynergyNet multi-touch table.*



C. Working collaboratively in a multidisciplinary team to create useful, practical tools

LDSE

Despite the key role of teachers in any radical educational change brought about by the introduction of technology enhanced learning, there has been no large-scale development of software to assist teachers in the critical task of learning design. The Learning Design Support Environment project (LDSE) is using digital technologies to support teachers in designing effective learning programmes involving technologies as appropriate. In contrast with course and lesson planning for a conventional environment, the availability of new tools for the teacher present a new kind of design challenge. The tools this project is developing are based on previous work on the London Pedagogy Planner, an interactive tool for designing teaching and learning at both module and session levels, and Phoebe, which supports the design of individual sessions, using a community-owned resource bank of learning designs. Figure 5 summarises the key research issues the project sets out to address.

Figure 5 LDSE key research problems

- What kind of digital environment will enable teachers as a community of practitioners to lead innovation and carry out successful design for TEL?
- What are appropriate ways of modelling the activity of learning design conceptually, so that it can be implemented within a digital environment?
- To what extent can we adapt existing approaches to user modelling to the complex activity of collaborative learning design?
- What are the optimal forms of representation of knowledge about teaching and learning?
- What are the appropriate ways to represent learning designs so that they can be tested, adapted, shared and reused by teachers and lecturers?

The LDSE project is working with practising teachers to research, and co-construct, an interactive Learning Design Support Environment (LDSE) with tools to scaffold teachers' decision-making from basic planning to creative design, with a focus on promoting appropriate use of digital technologies to enhance learning. Through an iterative research-design process they aim to build the tools and processes by which the teaching community can build on each others' work and thus collaborate on improving the practice of teaching and learning. The project requires a strong commitment to interdisciplinarity at every turn, recognising the need to formalise the pedagogic approach in ways that are understandable for the computer scientists on the project.

hapTEL

An application of new technologies exemplified by the hapTEL project (haptic technology enhanced learning), working in dental education, is in enhancing the experience of learning as a more **multi-sensory** experience. In their work, dentists operate with touch in a three dimensional environment and the project represents a giant step forward in simulation. The overall aim of the hapTEL project is to design, develop and evaluate a virtual learning system, which combines physical and digital interfaces. Haptics, which allows learners to experience touch in a digital environment, is the main feature of the virtual system that links physical interaction with digital interaction.

The system is being integrated into the dental curriculum where the following are being taken into account:

- the different skills which might be found between the students;
- their abilities to interpret three-dimensional screen images, digital sound effects, and the feedback produced by their actions;
- the connection between actions performed physically (e.g. manipulation of haptics and foot controls) which are captured digitally (e.g. computer text-based logs) and produced visually (e.g. haptic and graphic replay); and,
- the extent to which students can relate the above processes to concepts in traditional text-based course materials, which are needed to practise particular clinical skills.

The system allows information to flow between the physical and digital physical environment, and from digital to analogue states. It also provides opportunity to engage with traditional and digital forms of interactions. Students have to have a grasp of the digital literacies in order to transfer skills acquired in a digital environment to skills applicable in the physical world.

To be able to develop and evaluate a robust dental training simulation, the project team comprises people with diverse professional backgrounds with different levels of digital literacies. It is a challenging endeavour to balance the use of digital technologies (e.g. Web 2.0) and traditional means of communicating and acquiring the project's requirements and design decisions. The approach of combining traditional and digital modes is helping to reduce, for example, the terminological differences due to different literacies in different domains of the profession.

An important conclusion is that digital literacies are not independent of other literacies, there is a relationship between traditional literacy (the ability to read and write text), numeracy (the ability to manipulate and interpret numbers), mechanical skills (the ability to handle and understand various mechanical devices) and digital literacies, in the sense of the ability to use and understand a range of IT hardware, software, new forms of representations, and the interface between them, and most importantly, connecting and linking all of these literacies to meet the changing educational needs and practices.

Each of these projects then is also making a significant contribution to developing digital literacies in the programme through appropriating new forms of digital representations from learners' and teachers' interactions with new technologies.



D. Increasing authenticity & overcoming access issues

Digital technologies enable educators to make the boundaries between school and authentic domains of life and work more permeable. Learning opportunities can be made available literally beyond the school walls, as learning can be made more mobile, and accessible in different situations. We suggest that there is strong overlap between issues of authenticity, inclusion and indeed personalisation. Authenticity cannot be guaranteed by any blanket approach of technology brought into instructional environments. It has to be understood as perceived by the individual learner concerned. Each learner is an amalgam of diverse experiences, capabilities and understandings affected by the entirety of their personal history including experiences of physical strengths and weaknesses. Thus authenticity has to be developed in a personalised way.

Personal Inquiry

The Personal Inquiry project aims to support children aged 11-16 to investigate science related topics, guided by an ultramobile personal computer. The focus is on supporting inquiry learning: the ability to plan, carry out and interpret novel investigations. Computer-supported inquiry learning can be a powerful approach for personalising learning about scientific ideas, but children need help with designing and managing appropriate investigations. One project aim is to support children to conduct inquiries that are personally relevant to their lives, thus increasing their engagement by improving authenticity.



An “activity guide”, software that runs on mobile and desktop computers, supports children in investigating issues that affect their lives - through a scientific process of gathering and assessing evidence, conducting experiments and engaging in informed debate. This is part of their computer toolkit, designed to enable scripted inquiry learning, where scripts are computer programs, like dynamic lesson plans, that guide and support the learners by providing them with a set of structured activities, data probes, and other resources while allowing the teacher to monitor and guide student activity.

Student activities are based around the themes of Myself and My Community: key elements of the 21st century science curriculum. The approach taken is to co-design the pedagogy and the technology and iteratively test these out in a series of inquiry studies, whose results feed into the next design iteration. Topics of already completed inquiries include exploring the relationship between heart rate and exercise; investigating healthy eating; and investigating urban heat islands (UHI) and microclimates.

Through these topics the project team have explored challenges surrounding the personalisation of learning. For example, to what extent is personal inquiry possible within a curriculum driven by exam board criteria? Running two studies where 138 GCSE¹ pupils carried out an urban heat island inquiry

¹ The GCSE is an important qualification for students aged 14-16 in England, Wales and Northern Ireland and usually takes two years of study.



allowed the project team to explore this issue. In the initial study, it was not practical for students to select their own topic, and this led to less engagement for some pupils, and this in turn, led to a greater support of personalisation (including topic choice) in the next version of the toolkit. However, in the healthy eating inquiry the team found that activities that were too personally revealing (taking photographs of everything eaten during one day) led to a reluctance to share data, or even to capture it in the first place. So the appropriate level of personalisation needs to be found that will engage children without invading their privacy.

Inter-Life

The Inter-Life project starts from the recognition that educational and social transitions can have potentially negative impacts on performance and motivation. Inter-Life focuses on supporting children and young adults in developing skills to manage the risks and threats encountered during such transitions. A mobile virtual environment called Inter-Life has been developed from and beyond the popular Second Life² virtual world. A significant feature of the environment is the ability to interact with and between real and virtual communities enabled by the design of a distinctive communication architecture to improve accessibility. The tools developed during the research will support a mixture of controlled and uncontrolled activities which will promote the creative exploration of authentic feelings and experiences, as well as facilitating a structured approach to skill development. The two main tools being employed are:

1. A virtual space or “diary room” which will provide a “built in” mechanism for personal and facilitated reflection, for skills development, for data gathering and for Inter-Life evaluation.
2. An e-Portfolio to record and document participant development against transition outcomes.



Conclusions

Challenges in working towards a holistic understanding of what it means to work to develop digital literacies

This research briefing has reviewed some ways in which the TLRP-TEL projects are taking the digital literacies agenda forwards. The TLRP-TEL programme seeks diverse approaches aimed at dissolving unhelpful barriers between different disciplinary approaches, between formal and everyday situated practices and those that are experienced as material obstacles. Significant challenges remain however for all those concerned with working 'on the edge' of educational practice including in respect of what implications may lie ahead for developing curricula, assessment and other policy matters more broadly.

All the TLRP-TEL projects work by integrating the development of new technologies in an interdisciplinary environment, through design processes that involve user/stakeholder participation, to enhance learning and teaching in diverse, well-specified ways. The projects' design philosophies involve working with digital literacies as the project teams work with users in the developments. The new tools and pieces of equipment are designed iteratively, taking account of stakeholders' diverse aims and practices. Within the project teams too, the development of digital literacies is instantiated in the internal, dynamic communicative processes of multidisciplinary working that characterises new literacy practices.

Developing digital literacies means working to enable students and teachers to develop their understandings of and skills in using certain tools, not as decontextualised competencies but in ways that are connected to other aspects of their learning. Practices involving digital literacies can fruitfully bridge gaps between people's home and school learning lives (Davies & Merchant, 2009; Willett, Robinson & Marsh, 2009). Some projects within and beyond this programme have shown ways in which innovative approaches to the design of environments can bridge gaps between people's home and school learning lives and take us forwards to consideration of a more fruitful 'learning ecology' approach (Barron, 2006). There is increasing recognition that young people can have very different configurations of skills and knowledge. Whilst certain platforms, tools (such as MySpace, Facebook, Flickr, Twitter) and online games enjoy enormous popularity, young people develop diverse practices and interests within them. Some of the digital literacies associated can clearly be of relevance to the educational world: creativity, collaboration and criticality are valued in online spaces and in education.



Courtesy of Apple

A three year investigation of youth media practices in the US: *Digital youth research project – kids' informal learning with digital media* found that "...the digital world is creating new opportunities for youth to grapple with social norms, explore interests, develop technical skills and experiment with new forms of self-expression" (Ito et al. 2008, p. 1). Most of the informal learning activity involved was friendship-driven. In addition, some young people in the study used online resources to extend interests, to pursue topics they encounter through hobbies or schooling, accessing new networks and resources. Such activities are enjoyed as constructive and participatory, and have an appeal in the immediacy of interaction and results that can be contrasted with the 'delayed gratification' characteristic of the formal education system. Digital technologies mean youth are able to connect publicly in ways that were not available to earlier generations. Tackling issues about the value of new online practices, the project team observe that questions of learning are inseparable from debates about inter-generational tensions over what is valued as knowledge and social engagement.

Significant challenges lie ahead for all innovatory projects, whether within or beyond the programme. The issue of sustainability is not only a matter of how effective a particular project is over the time and space of an intervention. It is also a matter of fit with a rapidly changing environment, not a matter of 'fitting in' as if to a static setting. The current context of social and technological change requires a seismic shift in thinking about pedagogy. What are the consequences for pedagogic practices when: (i) issues of access and authenticity will continue to bedevil; (ii) teachers (or their students, or anybody else) cannot possibly keep up with all technological developments as they occur; (iii) therefore well-tried approaches to assessment become less appropriate to digital literacies?

Access for all remains a significant and complex issue. As JISC (see e.g. JISC, 2009) have recognised most of the tertiary sector learners their studies have researched have access to their own personal technologies but those who do not are at a disadvantage. All learners expected their institutions to





support their technology, potentially for continuous access. The TLRP-TEL programme is contributing to understanding of ways in which digital literacies can be employed to enhance inclusion; this is being especially pursued by the Digital Inclusion Forum: see http://www.tlrp.org/tel/digital_inclusion/.



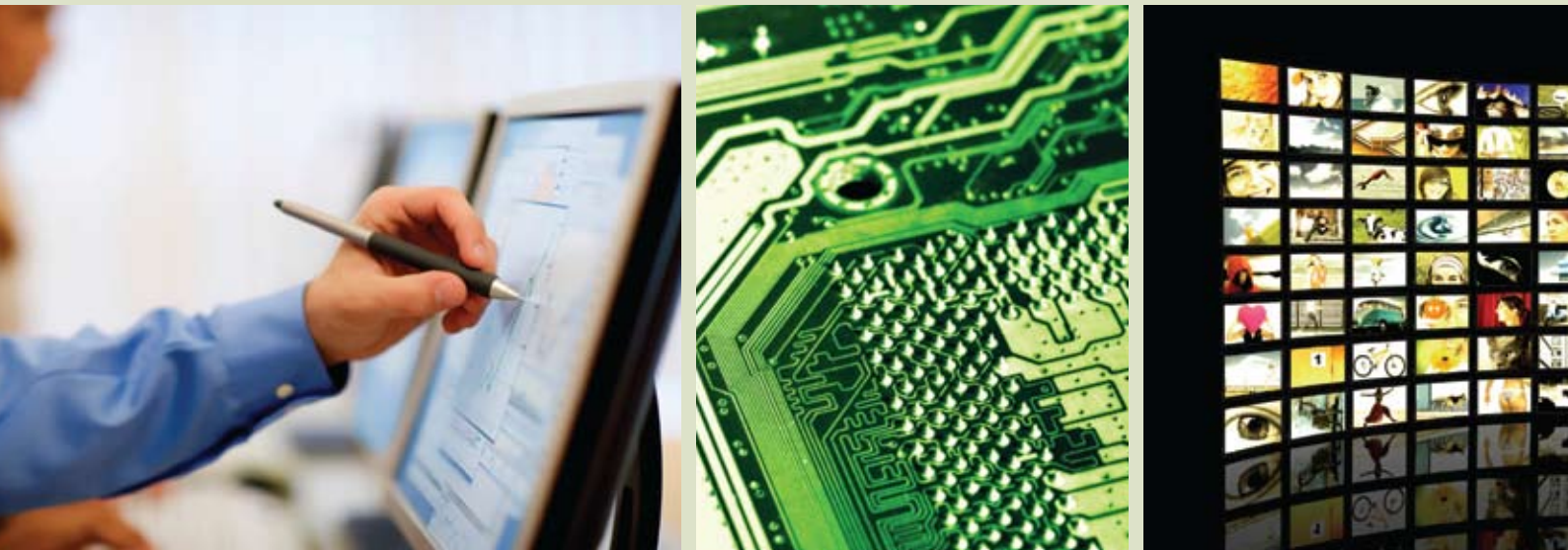
In a rapidly developing technological environment, it is often not possible for the teacher to be the possessor of all knowledge. Projects outside the

programme too have run up against this issue common in an environment where technological development is fast-paced and initially at least, demands knowledge and skills beyond that which all teachers have. This is not, of course, generally an issue in more traditional arenas of learning, where teachers are expected to be holders of all relevant knowledge and act consistently as experts. In the Schome Park pilot project for example (Gillen et al. 2009) adults and teenagers were learning together in Europe's first 'protected island' in Teen Second Life, a simulated 3D virtual world where virtually all were new to the tools and the environment. Interesting challenges arose as many teenagers became quick to learn many of the skills and potentialities of the tools yet did not necessarily have good skills at sharing them. A collaborative ethos developed which included the development of, for example, 'classrooms in the sky' constructed by students for the benefit of new students and staff members. The project found that the skills of the staff in bringing together facilitative strategies, modelling a collaborative ethos, and organising activities continued to make their influence highly salient, while leadership needed to be fluid (Peachey, Gillen & Ferguson, 2008). Knowledge and understanding are gained across combinations of people acting together through and with artefacts, instantiating distributed cognition as discussed above. The creation of supportive, problem-solving communities is therefore an important aspect of the educational facilitation of development in digital literacies (Beetham, McGill & Littlejohn, 2009; Twining 2009).

The picture drawn here of what is involved in digital literacies is different in its implications from the 'individual skillset' view that is still very prominent. Although most contemporary documents on digital literacy pay some attention to collaboration it is nonetheless clear that ultimately such concepts funnel down to a firmly individualist base, implicating the teacher as the all-knowing expert. Becta (2009, p.6) for example urges that "pupils leave KS2 digitally literate, intelligent users of technology, and prepared for lifelong learning". This is enabled through teacher support to develop ICT skills and understanding, including for the purposes of enhancing 'higher order thinking and learning skills in all subject areas.' At the base are "basic ICT skills." We are not arguing that this is wrong, but rather that it is a model still tied essentially to traditional instructional practices, the imposition of uniform standards and the development of the individual's skillset in ways that are predetermined and readily measurable. It is a different view from one which might ask whether the most authentic meaningful journey is that by a group of people working together with technologies in explorations that are not wholly predetermined. Here though lies a key question that has hardly been posed, let alone approached: How can assessment practices be developed in line with the opportunities and challenges of the collaborative, creative practices of the new digital environment? Only when this is answered can transformative pedagogies really take flight.

Response: Contextualising Digital Literacies

Fred Garnett



Background

This response is designed to build on the above research briefing by attempting to capture both the context of, and the emerging issues relating to, the “new culture” of Digital Literacies, as they can be identified in 2009. My concern here is to use the understanding of the debates surrounding Digital Literacies discussed here to help develop our own understanding in light of the learning emerging from the TLRP-TEL projects. From this I hope to identify where we might engage with and mutually develop an understanding of Digital Literacies with the other communities concerned with this issue.

In order to do this I have not only looked at a range of initiatives, research and reports in the UK, but also across the EU and the USA, where they have differing but complementary concerns concerning Digital Literacies. Undoubtedly further changes in thinking about Digital Literacies will emerge from these, and perhaps other, sources, which we will need to remain cognisant of. It is clear that there is, as the EU puts it, an “evolving agenda” relating to Digital Literacies and the concern here is to propose a framework in which we can position the learning emerging from TLRP-TEL projects regarding Digital Literacies. We hope that this will enable us to engage with these ongoing discussions concerning Digital Literacies in a deeper way, and also to offer a more positive take than that traditionally offered where literacy issues are concerned.

1) Literacy as a “deficit model”

The concept of literacy has historically been discussed in terms of a “deficit model” in the educational context. Whether in the notion of an “Adult” Literacy or in the more recent requirement of Study Skills, particularly in colleges, but also in most other learning contexts, literacy is usually identified in terms of something missing from a learner’s skills. In recent times Digital Literacy, amongst other newer literacies, has also emerged as a new issue to address in education, but often containing a deficit model dimension. More positively however Literacy can also be seen as a part of the ongoing concern to provide a more



socially inclusive education, and Digital Inclusion is also a theme of the work in this programme.

As previously indicated in this TLRP-TEL series we regard Education 2.0 as an aspiration and identified Digital Literacies as a key element of that in making that happen. Our view is that Digital Literacies are an enabling skill allowing for a broader range of learning interactions, using a greater range of tools, which then offers the possibility of a wider range of traceable meanings to be made in society.

2) ICT Literacy and Social Exclusion

My experience in addressing Digital Literacy began when I was asked by NIACE to identify what "ICT Literacy" meant regarding social inclusion for their 2001 Conference looking at "Online learning and social exclusion." NIACE emerged out of the WEA and social activism after World War One and have a long history of addressing Adult Literacy, indeed the Arts Council and the British Film Institute emerged from their initiatives (NIACE, 1999). In 1928 they were asked by the BBC to look at "New Ventures in Broadcasting" linking Education and broadcasting, so developing literacies for engaging with technology-enhanced learning can be seen to have a long and noble tradition in civil society in the UK. This conference sought to address learning issues raised by Government's £250m Community Access to Lifelong Learning initiative, which was based on the premise that social and digital inclusion could be addressed solely through "access," and set about providing that access nationally through a network of 7,000 UK online centres. NIACE, along with others including Neil Selwyn, thought this was an under-theorised position, and promoted a strand of work and research looking at online learning and social exclusion. (Clark, 2002)

In a paper entitled "The 6 ICT Literacies" (see Whitworth 2009) I argued that ICT Literacy was complex and that a "literacy for learning" in an ICT-rich environment (or a Digital Literacy) was a "composite literacy" requiring changed and more complex roles for all involved, including educators. "Community learning" centres are typically "andragogic" learning environments where educators needed to create learning communities and facilitate learning skills that were "fit for context" and this requires new "engaging" content creation tools, which also needed new skill sets.

As this research briefing has demonstrated Digital Literacies need to be positioned against a rich and complex historical context addressing learning skills, teaching roles and also a range of social issues. Issues which are made more urgent as we move towards a digitally driven knowledge economy and the social transformations that it requires.

3) An overview of approaches to Digital Literacies

In recent times, and particularly in the past year, there has also been a wide range of initiatives concerning Digital Literacies. A brief overview of these as they address Digital Literacies from their various perspectives enables us to draw out four main "approaches" to the issue. Most importantly

educationally is the positive notion that Digital Literacies are firstly about critical thinking. A broader view of education suggests that we are acting in an increasingly mediatised landscape and consequently media literacy, and the ability to use that literacy to participate in various ways, is critical. The increasingly digitised landscape of learning and society leads some writers to focus on key issues concerning Digital Inclusion, whilst the ever-rapid development of a Digital Society means some approaches relate Digital Literacy to Digital Citizenship and a greater concern with the attendant ethical issues.

a) Critical Thinking

In an educational context Digital Literacies are nearly always concerned with improving critical thinking relating to subject understanding. As Futurelab put it in their work they are concerned with “research and evidence on developing digital literacy and digital participation in the classroom” and for them “digital literacy means knowing how technology and media affect the ways in which we go about finding things out, communicating with one another, and gaining knowledge and understanding” (Hague and Williamson, 2009). Appropriately designed digital technologies, can enable a more critical understanding of subjects and disciplines than that afforded by information literacy alone. Newman (2009) sees Digital Literacy in formal learning contexts as being subject related, but she also sees it as a learning skill that needs to be taught and supported.

b) Media Literacy and Participatory Culture

Whilst there is a deep and real concern with media literacy and participatory culture in the UK, not least in the work of David Buckingham (2007) and Andrew Burn (2009), it can be argued that research into this has been more thorough going in the United States where the relationship between culture and society is both viewed and theorised differently. Jenkins (2006) calls for “coupling the pedagogical use of new media technologies with a greater focus on media literacy education” whilst Rheingold sees the need for literacies enabling civil engagement in the Digital Age, what he calls 21st century literacies (Rheingold 2009), as requiring “attention, participation, cooperation, critical consumption, and network awareness.” Rheingold sees a more participatory online culture resulting from this. In responding to Jenkin’s identification of the “challenges of participatory culture” Burn usefully sees a way forward in a media education that “evens out...access to media texts, technologies and cultures.” OFCOM (2009) has recently identified media literacy, including the ability to create media products, as being a requirement for engaging in the digital economy.

c) Digital and Social Inclusion

As we have seen literacies have historically had a focus on being socially enabling and most national policies relating to the Knowledge Economy in a democratic context are rightly concerned to ensure equality of economic opportunity for all. The Europe Union has a key theme looking at “e-inclusion” as a strand in its Information Society research and development work. Arguably in the UK we have failed to address this sufficiently, although Digital Britain (2009) highlights it and the Internet entrepreneur Martha Lane Fox, has been appointed a “Digital Champion” to promote digital inclusion. Futurelab have published regularly on this including identifying a “Charter for Change” if we are to move “Beyond the Digital Divide” (Facer and Selwyn, 2007). Despite the often “deficit model” formulation of Digital Inclusion this remains a key issue for Digital Literacies to address.



d) Digital Citizenship & Internet Safety

In a digital-driven Knowledge Economy with an increasing need for digitally literate knowledge workers, education needs to provide opportunities to acquire digital skills. In such a situation an attendant concern is the degree to which digital skills become pre-requisites for active citizenship. Estelle Morris in Digital Britain calls for everyone to have “digital life skills,” (Morris, 2009) in line with the UK government’s recent merging of education and care. Furthermore, as digital competence becomes an ever-increasing requirement for engaging in social life, a range of related ethical concerns emerge, of which “internet safety” is the both the most pressing and the most theorised; in Britain we have recently had the Byron Review, “Safer Children in a Digital World” (Byron, 2008) that seeks to address this.

So, we can see that there are a range of approaches to Digital Literacies all of which are “evolving” but from which clear issues can be identified and addressed as we develop our own understanding of Digital Literacies. The JISC LLiDA report on “Thriving in the 21st Century, Learning Literacies for the Digital Age” (Beetham, McGill and Littlejohn, 2009) provides a particularly wide-ranging and useful literature review relating to these same issues and also discusses possible “frameworks”.



4) Digital Literacies and Development Frameworks

As well as these four “approaches” another emerging aspect of the work being undertaken on Digital Literacies is the notion of providing a “development framework” to help usefully position the learning that is emerging from different initiatives and in different contexts.

From her work on Digital Literacy in formal learning contexts Tabetha Newman concludes that one way of better making sense of the use of emerging, digital, technologies is to create a development framework for schools (Newman, 2009). This could enable Digital Literacies to become embedded educationally by identifying possible institutional responses, and also help identify possible future uses as Digital Literacies evolve. Such a framework is necessarily incomplete of course, but can serve as a useful heuristic to help us situate our developing understanding of Digital Literacies. The mapping framework here is offered as a contribution towards enabling the TLRP-TEL projects to better understand how they might inform the evolving agenda of Digital Literacies. We also need to be aware of other complementary frameworks, such as those offered by SCONUL, JISC and Becta and identify ways of engaging and working with them as we try to refine our own understanding of Digital Literacies, perhaps even producing our own Development Framework in line with the ideas expressed in Education 2.0 (Selwyn, 2008).

In the framework offered here the rows are based on the “key characteristics of developing Digital Literacies” as identified in the research briefing. The columns are based on the range of “approaches” identified across the various initiatives on Digital Literacies discussed above. An X in a cell indicates where TLRP-TEL projects will have learning to offer about Digital Literacies as they further develop. The framework is necessarily broadly drawn, and we will ultimately need a finer-grained version to enable us to fully make sense of that learning. It is also probable that other less obvious aspects of Digital Literacies such as, say, identity, as discussed by Russell Francis in *Beyond University Learning* (2010), may also need incorporating into our evolving understanding before a useful development framework is ready to be offered.

Fig 6: TLRP-TEL projects and a Framework for contextualising Digital Literacies

	Critical Thinking	Media Literacy/ Participatory Culture	Digital Inclusion	Digital Citizenship/ Internet Safety
Cognitive Developments	X			
Collaborative Problem Solving	X	X		
Multidisciplinary Tool Creation	X	X		
Authenticity & Access			X	X

6) Developing our understanding of Digital Literacies

The EU views Digital Literacy as “an evolving agenda” and sees a continuing need for “stimulating initiatives and ‘tools’ in this area” (Shapiro, 2009). The current political and cultural context in which Digital Literacies are constantly being updated and reviewed means that this agenda might evolve significantly in 2010 with new issues to be addressed by 2015. However as TLRP-TEL Projects are propitiously building a range of tools, which cumulatively address the key concerns of Digital Literacies as highlighted above, we will be well placed to provide useful analysis and reviews of what we learn as this agenda unfolds.

As they are projects in which inter-disciplinary teams are building new tools collaboratively and with a user-focus, they are also finding that they have many new problems to solve, which will then provide further perspectives for us to consider. In their own problem solving, and in their own learning about what constitutes Technology Enhanced Learning, the project teams are well positioned to further inform, and learn from, the debate surrounding Digital Literacies. We intend to continue to address this

throughout the life of the programme and in so doing we will be providing new tools and also become better able to inform new initiatives designed to address these concerns.

Finally this response represents my own high-level interpretation of what we are learning about Digital Literacies from the TLRP-TEL projects at the moment, but it is necessarily an abstraction from the fine-grained learning that is actually being achieved within the projects themselves and across the programme. The energy, enthusiasm, and innovation exhibited by the eight project teams suggests that we will be offered much new information to consider in developing our understanding of Digital Literacies, whilst the intelligence and intellectual analysis that they bring to their own projects suggests that they themselves will be providing many of the new insights into understanding Digital Literacies in this ongoing, and hopefully mutual, learning process.

References

- American Recovery and Reinvestment Act of 2009. http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h1enr.pdf (accessed 19 August 2009).
- Baron, N. (2008) *Always on: Language in an online and mobile world*. Oxford: Oxford University Press.
- Barron, B. (2006) Interest and self-sustained learning as catalysts of development: a learning ecology perspective. *Human Development* 49 193-224.
- Barton, D. (2007) *Literacy: An introduction to the ecology of written language*. 2nd edn. Oxford: Blackwell.
- Barton, D. and Hamilton, M. (1998) *Local literacies: Reading and writing in one community*. London: Routledge.
- Becta (2009) Becta's contribution to the Rose Review. <http://publications.becta.org.uk/display.cfm?resID=40240> (accessed 1 October 2009).
- Beetham, H., McGill, L. & Littlejohn, A. (2009) *Thriving in the 21st century: Learning Literacies for the Digital Age* (executive summary, conclusion and recommendations). The Caledonian Academy, Glasgow Caledonian University for JISC. <http://www.jisc.ac.uk/media/documents/projects/llidaexecsumjune2009.pdf> (accessed 26 June 2009).
- Beetham, H. & Sharpe, R. (2007) An introduction to rethinking pedagogy for a digital age. In H. Beetham & R. Sharpe (eds.) *Rethinking pedagogy for a digital age: Designing and delivering e-learning*. London: Routledge.
- Berners-Lee, T. (1999) *Weaving the web: The past, present and future of the world wide web by its inventor*. London: Orion.
- Buckingham, D. (2007) *Beyond Technology; Children's Learning in the Age of Digital Culture*. London: Polity Press.
- Burn, A. (2009) *Making new media*. New York: Peter Lang.
- Byron, T. (2008) *Safer children in a digital world*. London: DCSF.
- Clark, A. (2002), *Online learning and social exclusion*. Leicester: NIACE.
- Coiro, J., Knobel, M., Lankshear, C. & Leu, D. (2008) (eds.) *Handbook of research on new literacies*. New York: Laurence Erlbaum.
- Cope, B. & Kalantzis, M. (2000) Introduction: Multiliteracies. In B. Cope & M. Kalantzis (eds.) *Multiliteracies: Literacy learning and the design of social futures*. London: Routledge.
- Davies, J. and Merchant, G. (2009) *Web 2.0 for schools: Learning and social participation*. New York: Peter Lang.
- Digital Britain Final Report (2009) http://www.culture.gov.uk/images/publications/exsumchpt9_digitalbritain-finalreport-jun09.pdf (accessed 19 August 2009).
- Facer, K., & Selwyn, N. (2007) *Beyond the digital divide*. Bristol: Futurelab.
- Francis, R. (2010) *Beyond university learning*. London: Routledge.



- Gillen, J., Twining, P., Ferguson, R., Butters, O., Clough, G., Gaved, M., Peachey, A., Seamans, D. & Sheehy, K. (2009) A learning community for teens on a virtual island – The Schome Park Teen Second Life Pilot Project. eLearning Papers no. 15: The New Generation. http://www.elearningpapers.eu/index.php?page=doc&doc_id=14397&doclng=6 (accessed 19 June 2009).
- Gilster, P. (1997) *Digital literacy*. New York: John Wiley & Sons.
- Hague, C. & Williamson, B. (2009) Digital participation, digital literacy, and school subjects: a review of the policies, literature and evidence. http://www.futurelab.org.uk/resources/documents/lit_reviews/DigitalParticipation.pdf (accessed 19 September 2009).
- Hutchins, E. (1998) *Cognition in the Wild*. Cambridge, MA: MIT Press.
- Ito, M. et al. (2008) Living and learning with new media: Summary of findings from the digital youth project. Online at <http://digitalyouth.ischool.berkeley.edu/files/report/digitalyouth-TwoPageSummary.pdf>. (accessed 25 January 2010).
- Jenkins, H. (2006) Confronting the challenges of participatory culture. <http://newmedialiteracies.org/files/working/NMLWhitePaper.pdf> (accessed 30 November 2009).
- JISC (2009) *Responding to learners pack*. <http://www.jisc.ac.uk/publications/documents/respondingtolearners#downloads> accessed (19 September 2009).
- Jones-Kavalier, B. & Flannigan, S. (2006) Connecting the digital dots: Literacy of the twenty-first century. *Educause Quarterly* (2) 8-10.
- Kaput, J., Hoyles C. & Noss, R. (2002) Developing new notations for a learnable mathematics in the computational era. In English, L. (ed) *Handbook of international research in mathematics education*. London: Lawrence Erlbaum. pp. 51-75
- Lankshear, C. & Knobel, M. (2008) (eds.) *Digital literacies: Concepts, policies and practices*. New York: Peter Lang.
- Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- Leu, D., O'Byrne, W., Zawilinski, L., McVerry, G & Everett-Cacopardo, H. (2009) *Expanding the new literacies conversation*. *Educational Researcher* 38(4), 264-269.
- Leu, D.J., Kinzer, C., Coiro, J. & Cammack (2004) Toward a theory of new literacies emerging from the internet and other information and communication technologies. In R. Ruddell & N. Unrau (eds) *Theoretical models and processes of reading* 5th edn. International Reading Association.
- Morris, E. (2009) Independent review of ICT user skills. London: DCSF http://www.dius.gov.uk/~media/publications/I/ict_user_skills (accessed 30 November 2009).
- Newman, T. (2009) Consequences of a digital literacy review: Moving from terminology to action. <http://www.slideshare.net/TabethaNewman/digital-literacy-literature-review-from-terminology-to-action> (accessed 30 November 2009)
- NIACE (1999) History briefing sheet http://archive.niace.org.uk/information/Briefing_sheets/History.pdf (accessed 16 November 2009)

- Noss, R. (2008) Preface. In N. Selwyn (ed.) *Education 2.0? Designing the web for teaching and learning*. Institute of Education, University of London: TLRP-TEL.
- OFCOM (2009), *Report of the Digital Britain Media Literacy Working Group* http://www.ofcom.org.uk/advice/media_literacy/media_lit_digital_britain/ (accessed 30 January 2009)
- Partnership for 21st Century Skills. Framework for 21st century learning. http://www.21stcenturyskills.org/index.php?option=com_content&task=view&id=254&Itemid=120 (accessed 27 January 2010).
- Peachey, A., Gillen, J. & Ferguson, R. (2008) *Fluid leadership in a multi-user virtual environment educational project with teenagers*: Scheme Park. Paper presented at International Society for Cultural and Activity Research, San Diego, USA. September 8-13. <http://www.open.ac.uk/cetl-workspace/cetlcontent/documents/48846df9d0d60.pdf> (accessed 22 January, 2009).
- Rheingold, H. (2009) 21st Century Literatures http://www.sfgate.com/cgi-bin/blogs/rheingold/detail?entry_id=38313 (accessed 16 November 2009).
- Selwyn, N. (ed.). (2008). *Education 2.0? Designing the web for teaching and learning*. Institute of Education, University of London: TLRP-TEL.
- Shapiro, H. (2009) *Supporting digital literacies, Topic report 4*. Aarhus: Danish Technological Institute. http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/dl_topic_report_4.pdf (accessed 30 November 2009).
- Tett, L. (2007) Adult literacy, the discourse of deficit and social justice. www.creid.ed.ac.uk/Papers/bera07/BERA07_LT.pdf (accessed 30 November 2009).
- Twining, P. (2009) Exploring the educational potential of virtual worlds — Some reflections from the Scheme Park Programme. *British Journal of Educational Technology* 40(3):496–514.
- Vannini, P. (ed.) (2009) *Material culture and technology in everyday life: Ethnographic approaches*. New York: Peter Lang.
- Wegerif, R., Mercer, N. & Dawes, L. (1999) From social interaction to individual reasoning: An empirical investigation of a possible socio-cultural model of cognitive development. *Learning and Instruction* 9 (6) 493-516.
- Whitworth, A. (2009) *Information Obesity*. Oxford: Chandos.
- Willett, R., Robinson, M. & Marsh, J. (eds) (2009) *Play, creativity and digital cultures*. New York, London: Routledge.

London Knowledge Lab
Institute of Education
University of London
23-29 Emerald St
London
WC1N 3QS

Tel: 020 7763 2189
Email: tlrp@ioe.ac.uk
Web: www.tlrp.org/tel

January 2010

ISBN: 978-0-85473-902-8

