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Thriving in the 21st century: the report of the  
LLiDA project (Learning Literacies for the  
Digital Age): Literature Review

## 2. Literature review

This section falls into four parts:

- 2.1 review of theoretical fields and high level concepts that have been deployed to help understand digital and learning literacies
- 2.2 review of current trends (the changing context outlined in Section 1) and more detailed evidence of the scale and scope of change
- 2.3 review of future scenarios likely to be of help in identifying future literacy requirements and trends
- 2.4 review of recent studies into how, in practice, learners' literacies are changing and institutions are responding to their needs

The preponderance of theoretical work over applied research in this field suggests a danger of digital literacies becoming a new orthodoxy: a set of terms to be laid over existing policies and institutional practices without any real changes to how learners experience their relationships with knowledge, learning and technology. We have tried to be alert to this danger in reporting our findings.

### 2.1 Key concepts

This brief review is not intended to provide a comprehensive account of the diverse literatures of learning and digital literacy, but to summarise key concepts of relevance to our scope and aims. References are provided for further exploration, and these are available in the form of live links on our web site: <http://www.academy.gcal.ac.uk/llida/>.

Theoretical field, high level term	Key concept(s)	Key theorists
<b>Literacies as social/situated practices</b>		
Academic writing/literacy	Literacy is to be understood: as social practice, involving power relations; as rhetorical activity embedded in different situations and cultures (e.g. disciplinary cultures but also peer and family cultures); as contested and constitutive of personal identity	Lea, Street, Ivancic
New literacies	Literacies = 'social practices of using codes for making and exchanging meanings'. New literacies come about in response to changes in the technical, epistemological and cultural order.	Street, Lankshear & Nobel
Meaning making	Literacy is about how meaning is produced and communicated: is bound up with knowledge in society/culture (including disciplinary cultures); changes continuously rather than discontinuously as technologies change.	Hannon, Kellner
Situated knowledge	All meaning-making takes place in specific social situations: literacies are best understood as situated knowledge practices. (Also) capability in practice is the product of an interaction between personal capability or disposition and the environment supporting action.	Brown, Collins, Duguid, Spiro
Literacy as embedded and contextual	Practitioner conceptions of 'graduate attributes' show wide disparity of understandings. Two clear tiers emerged: high-level 'stances' or 'attitudes' (scholarship, citizenship and lifelong learning); along with 'personal skills and aptitudes' which are highly context-dependent i.e. realised differently in different subject areas.	Barrie

Non-transferability of skills and knowledge	There is evidence that transferring skills from one context to another is more problematic than has been acknowledged. Learners also struggle to transfer formally learned ('analytic') knowledge to complex realworld situations where it must be applied. Tacit situational knowledge plays a vital role in competent performance.	Eraut, Dreyfus and Dreyfus See also Mannion et al discussed below
<b>Technology and technical literacies</b>		
Critical 'technoliteracies'	Pits the US 'no child left behind' Act of 2001 against the UN '2000+' project, arguing that the latter offers a democratic vision of multiple and critical literacies of technology, rather than a single standard of competence. Sees technical literacy as politically and culturally contested.	Kahn and Kellner, Feenburg (and many writers against 'technological determinism')
Next generation (user) skills	Changes to technology, e.g. organisational to personal and social, tethered to ubiquitous, applications to services, individual to shared, all entail new skills: agile adoption, personalisation, re-combination, exploration, a 'constant beta' mentality	JISC emerge community
<b>Media and media literacies</b>		
MultiModality	Representations now more commonly accessed via screen than page: this has a fundamental impact on how we 'read', on situated literacy practices, on knowledge and on learning.	Kress, Jewitt, Hannon
(Multi)media literacy	Technical changes to the nature of media, including computer gaming, entail shifts in education towards a multi-media knowledge practice and a 'postmodern' curriculum.	Buckingham, Sefton Green
Hypertext, hypermedia, metamedia	A completely new capacity for meaning-making is called for when representations become multiply linked and layered.	Landow, Lemke
<b>Information literacy</b>	...is '[the ability] to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information' Information literacy is the most widely recognised and supported of the digital literacies. To date the focus has largely been on individual use in the context of a specific task or problem. The idea of information literacy may need to be extended to include sharing and collaboration, and to accommodate ethical dimensions.	Spitzer, see also LearnHigher (2006) for review and references
<b>Learning to learn and meta-literacies</b>		
Learning to learn	There is a cross-curricular, general competence that can be defined as 'the ability to pursue and persist in learning'; also to 'develop learning strategies' suitable for different situations. This competence can be specifically trained and strengthened.	Claxton
Conceptions of learning	How learners interpret their experience is highly influenced by prior experiences of learning, and the interpretations that have arising from those. Digital literacies cannot be bolted onto existing practices and prior conceptions: these	Goodyear and Ellis, Biggs, Entwistle, Ramsden,

	must be recognised, incorporated and (if necessary) reconceptualised.	Säljö, Prosser and Trigwell
Multiple intelligences	<i>"literacies, skills, and disciplines ought to be pursued as tools that allow us to enhance our understanding of important questions, topics, and themes."</i>	Howard Gardner
MultiModality (again)	All learning involves multimodality: not understood as separate literacies but (Kress) a generic capacity to make sense across modes and media.	Kress, Jewitt, Hannon
Self-efficacy, self-regulation	Self-regulation is both a goal of learning and a process that supports learning: it is increasingly demanded in workplaces especially where knowledge work and innovation are involved. Forethought, performance and self-reflection are three stages of self-regulated learning.	Zimmerman
<b>New pedagogies</b>		
Learning 2.0	Learners' familiarity with web 2.0 technologies opens up a completely new space for and style of learning, focusing on: collaborative knowledge building; shared assets; breakdown of distinction between knowledge and communication	Downes, Anderson, Alexander, Walton
Learning 2.0 counter-evidence	Evidence that pro-active, creative web 2.0 practitioners are still in the minority of users (1:9:90 rule): many learners are introduced to such practices by teachers. Ubiquity, accessibility and ease of use are, however, features of technology that are changing informal learning practices.	Redecker, see JISC Learners' Experiences of e-Learning programme in section 2.3
Connectivism	Individual processing of information gives way to development of networks of trusted people, content and tools: the task of knowing is "offloaded onto the network itself"	Siemens
Communities of enquiry	Building on Wenger's notion of communities of practice, (higher) learning conceived in terms of participation, with learners experiencing social, cognitive and pedagogic aspects of community.	Wenger, Garrison and Anderson
Theory/practice, practical inquiry	Action (practice) and discussion (theory) in shared worlds is internalised, leading to personal capability (practice) and conceptualisation. Specifically facilitated thru social technologies and CSCW	Vygotsky, Garrison,
Academic apprenticeship	Literacy as situated social practice is best acquired through apprenticeship model, situated in disciplinary ways of knowing	Holme
E-learning, e-pedagogy	New forms of learning and teaching are enabled – and required – by digital technologies. Typically more constructivist and learner-led.	Mayes and Fowler, Cronje
<b>'New' learners</b>		
Lifelong learners	Changing patterns of employment require workers to constantly update their skills; demographic changes are	Boud, Field, Coffield

	also skewing participation towards older learners in full or part-time employment. Technology is seen as key to delivering flexible opportunities to lifelong learners.	
Virtual learners	Saturation in virtual worlds and online networks alters perceptions of self and relationships with others, including learning relationships. For some this can be liberating: others struggle with a loss of 'presence' and changed social cues.	Smith and Curtin, MacLuhan See also 'online learning' literatures
Digital natives, immigrants and refuseniks	The post-internet generation inhabit a digitally-mediated world: the older generation, including most teachers, struggle to be at home in this culture. In fact the evidence is against a strongly age-related effect (see below) and even Prensky has moved against this distinction.	Prensky, Tapscott, see also OfCom (2008) in section 2.3.
Google Generation	Those born since 1985 exhibit particular tendencies towards information and learning: ubiquitous information, constant communication, multi-tasking, juggling multiple identities, valuing knowledge for how it can be used and re-used in the moment, 'cool', interconnected	Oblinger and Oblinger
Digital natives/ Google Generation – counter evidence	Situation, available technology and prior experience are all more powerful predictors of 'googling' behaviours than age (i.e. it is not primarily a generation effect) Factors such as social class, level of education and prior experience of technology may be more significant than generation. Technology is ubiquitous in young peoples' lives but most lack information skills and strategies for learning with technology. Empirical studies suggest use of web 2.0 and innovative technologies quite limited: far more young people read blogs and wikis than contribute to them, for example.	Bennet, Margaryan and Littlejohn, see also JISC Learners' experiences of e-Learning and Digital Natives reports in section 2.3.
<b>Learners' informal techno-social practices</b>		
Collaborative production (prosumerism/produsage)	New ways of sharing content online are blurring the boundaries between creative production and consumption, thru practices such as commenting, reviewing, re-purposing, re-tweeting, media meshing. Education needs to respond by focusing on creative collaboration.	Bruns & Humphreys, Landow
Informal and nonformal learning	Online social networks and open content create vast new opportunities for individuals to learn, outside of or alongside formal learning.	Downes, Katz Seely Brown & Adler, Luckin
Visual learning	There is conflicting evidence over whether younger and non-traditional learners in particular prefer image-based over textual content for learning.	Coffield, see also JISC/British Library study in section 2.3
Knowledge practices (clash of)	Learners with experience of free content, open sharing sites, the 'eternal now' of the network, distributed attention, and the opinion-led blogosphere (amateurisation, collective intelligence), may struggle with academic knowledge practices around originality, authority, depth of attention,	Gurak, Jewitt

	historical paradigms, and attention to method. Also highly textual vs 'media-mesh'.	
<b>New institutions, and challenges to the institution</b>		
The University in the digital age	Digital networks and open content present specific challenges to the integrity of the university: e.g. permeable boundaries; how to give students a coherent educational experience; how to balance students' free use of technology with risk of copyright violations or security threats; destabilization of the traditional lines of authority in the classroom; clash of values and practices around knowledge.	Benkler, Barnet
21 <sup>st</sup> century skills/literacies	Govt-led agenda in both UK and US to maintain and extend competitive advantage by upskilling workforce with skills for a largely ICT-based, high-value service economy – entails major refocusing of post-compulsory learning around perceived needs of national economy, partnerships with employers and employment sectors.	UK Govt (e.g. Leitch report, e-skills) US gov't (e.g. No Child Left Behind, 21 <sup>st</sup> century skills partnership)
Informal and nonformal learning	Online social networks and open content create vast new opportunities for individuals to learn what they need to know without engaging in formal learning.	Luckin & Garnet,
Deschooling	A European Commission communiqué in 2001, suggested current models of schooling could not generate sufficient digital capacity, that European states must distribute teaching capacity much more widely through society, and consider whether more effective learning could take place via ICT delivered to homes, workplaces and local communities.	Illich

**Table 2.1 Key concepts and theorists of learning and digital literacies**

### 2.1.1 Summary of key messages and some practical implications

#### Literacies as situated practices

Literacies as defined in our scoping section cannot be acquired through one-off induction sessions or skills training, though these can help orient learners to what will be required of them in further and higher education.

Learners require opportunities for ongoing practice, embedded in subject contexts and in tasks of real relevance to their learning goals and assessment criteria.

Practices of knowledge creation and sharing in subject contexts must be made clear to learners as part of their ongoing development.

Capable individuals acquire a range of meaning-making practices, and manage contradictions among them in terms of their participation in different contexts (sometimes termed rhetorical competence, related to managing multiple identities).

#### Learning to learn

'The ability to pursue and persist in learning' can be enhanced in individuals, largely through positive experiences of learning. However, there is some evidence that exposure to successful learning strategies and habits, and/or explicit prompts to reflect, self-diagnose, analyse and plan, help learners develop their

own strategies for learning.

Digital technology offers new opportunities for exposing learners to the practices and habits of others (e.g. through process and data capture, participatory technologies) and for supporting reflection, diagnosis and planning (e.g. through e-portfolios).

Digital literacies cannot be bolted onto learners existing practices and prior conceptions: these must be recognised, incorporated and (if necessary) reconceptualised.

### **Technologies and technical literacies**

Those who think digital tools can readily be assimilated to existing practices of representation and communication are in a minority: most believe that they are fundamentally changing what it means to communicate, make meaning, think, work and learn.

Those changes come about because of changes to our culture and social practice around the use of technologies, rather than through the technologies themselves.

Education can play a role in influencing future cultural and social practices with technology.

Ubiquity, availability, ease of use, low cost are all features of technology that are having major impacts on how learners access information and communicate with one another: there may be changed expectations of education as a result

In terms of functional access to basic ICT, the digital divide may be getting narrower but deeper as lack of access has a more profound impact on individual learners.

### **Media and representation**

Learners need skills in critically evaluating and creatively producing representations in a variety of media. General media types include text, speech and image.

The media required may vary from subject to subject: media with a clear subject relevance include mathematical and scientific (notation systems), spatial, narrative, virtual (e.g. gaming, simulations).

The jury is still out on whether digital hypermedia (multiple forms of representation, multiply linked) require a fundamentally different approach.

Informal media practices – perhaps particularly among young people - differ from academic practices of representation and production.

### **Information literacies**

There is less theoretical and conceptual disagreement over information literacies, probably because it has been much longer established as a concept and set of practices.

Existing conceptions of information literacy have been criticised for focusing too strongly on individual use in the context of a specific task or problem, and for failing to recognise different cultures of information use.

There may be a case for extending the idea of information literacy to acknowledge that many informational tasks are carried out collaboratively, to include sharing of information as a component competence, and to accommodate cultural, ethical, safety and citizenship dimensions.

There is also debate over the best way to support information literacies, whether by expert subject librarians in specialist settings, or integrated fully into curriculum tasks, assessment and learning support.

As institutions move towards more integrated strategies for educational content management, including learner-generated content, the requirements for information literacy among staff and students may be

further extended.

### **Learners**

Ubiquity, accessibility, rapid feedback and ease of use are all features of learners' daily experience with digital technologies which are changing their expectations of education.

Experience with web 2.0 technologies, particularly active engagement such as creation of blogs and wikis, tagging, meme-ing, reviewing, writing fan fiction, remain minority activities to which many learners are introduced by educators.

Educators make assumptions about learners' facility with technology at their peril:

- even confident internet users often lack evaluative and critical skills
- even learners with their own laptop, smartphone and other devices may have no idea how best to use them to support their learning
- even the 'net generation' can have low levels of ICT skill and a history of negative experiences with technology in school
- HE and FE are increasingly catering for adult learners who may have little or no experience of ICT use

The jury is still out on whether there is a clear 'google generation' effect in terms of preferences for and approaches to learning: the picture is more complex than the buzzwords suggest.

The digital natives/digital immigrants distinction is no longer regarded as particularly helpful, even by Prensky (2001, 2009), who now prefers the notion of 'digital wisdom'. Other commentators agree that digital capabilities are multiple and individual.

Learners make choices about technology – indeed choice and consumption is a key frame through which they view the technology-mediated world. There is some evidence of a minority of 'digital refuseniks' making active choices to avoid the use of ICT for aspects of their social and educational practice.

### **Developing learners**

Learners can become more critical, evaluative, self-aware, self-confident, skilled and capable in the use of technologies

Learners can develop a wider and more effective range of strategies for their own learning.

Although some of these capabilities may be 'generic', the consensus is that they are best supported in 'communities of practice', 'communities of inquiry', or 'learning groups' focused on tasks of value and interest to the learner.

Skills acquired iteratively, through practice, and as needed are better retained than those taught one-off, in isolation, and through instruction.

There is conflicting evidence about the success of 'new' pedagogies of the digital (the 'no significant difference' phenomenon) in supporting learners to develop new skills.

Understanding literacies as situated practice means, in developing learners:

- providing authentic contexts for practice, including digitally-mediated contexts
- individual scaffolding and support
- making explicit community practices of meaning-making
- anticipating and helping learners manage conflict between different practice contexts
- recognising and helping learners integrate their prior conceptions and practices

There is a tension between recognising an 'entitlement' to basic digital literacy, and recognising technology practice as diverse and constitutive of personal identity, including identity in different peer, subject and workplace communities, and individual styles of participation.

These conceptual conclusions and implications have directly informed our Framework of Frameworks in Section 3.

## 2.2 The changing context

The nature of **work** is changing, not just for the growing numbers of graduates directly employed in the 'digital' industries (est. 1,500,000<sup>1</sup>). An estimated 77% of UK jobs<sup>2</sup> involve some form of ICT competence, requiring updating of skills as technology changes. Global digital networks are also having a profound impact on how organisations recruit the expertise they need. A recent TLRP report on *Education, Globalisation and the Knowledge Economy* (2008) notes that British graduates are competing for high skills, high value jobs on a global stage, in which graduates from emerging economies have several advantages. As the performance gap narrows rapidly, differences in labour costs are narrowing far more slowly, giving companies greater scope to extract value from highly skilled people in different locations. Thus ' *it can no longer be assumed that even British-based corporations will choose to employ British graduates if the same talent is available at lower cost elsewhere. Colleges and Universities in emerging economies are expanding faster than those in the UK and arguably expanding smarter, learning lessons from other education systems without the same brakes on organisational and cultural innovation.*'

This report uses the term 'digital taylorism' to describe the trend towards division of labour in the service and intellectual industries, dissecting what used to be coherent professional roles down to the level of discrete projects or even tasks. This is described as 'a power struggle within the middle classes, as these processes depend on reducing the autonomy and discretion of the majority of well qualified technical, managerial and professional employees. It encourages the segmentation of expertise based on 'talent', in ways that reserve the 'permission to think' to a small proportion of employees [or non-employees] responsible for driving the business forward. Middle class labour is also becoming less secure as digital networks make it easier for tasks to be contracted out on a piece-meal basis<sup>3</sup>, loosening the ties between businesses and employees. One likely outcome of the current recession is a restratification of middle class occupations.

Although estimates of the number of people likely to be employed in the 'knowledge economy' vary, it seems clear that individual working lives are becoming more complex, unpredictable, and inter-woven. There is a greater requirement for workers to be independent, self-motivated and self-evaluating, as well as a tendency for individuals to move jobs and careers more frequently and to be in fixed-term or flexible contracts (Naswall et al, 2007). Learning for life is no longer a policy buzz word but a requirement for individual economic well-being.

**Opportunities for learning** are also changing and by most measures becoming more numerous and openly available. Open educational content is burgeoning thanks to several high profile initiatives by leading global universities. Not only have digital technologies become widespread in formal education, but non-educational organisations are waking up to the potential of ICT to capture and communicate know-how (see e.g. Senge, 2006), while practical and social knowledge is shared almost continuously via the social web (Downes, 2005, Anderson, 2007, Alexander, 2008, Walton et al, 2008). A complication is that ICT skills are particularly likely to be acquired through self study or informal assistance from colleagues, relatives and friends<sup>4</sup>. Informal/non-formal learning has achieved a new prominence in educational discourse, to the extent that it has almost become the measure by which formal learning is

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<sup>1</sup> Source: e-Skills UK (2009) *Technology Counts: IT and Telecoms Insights 2008*

<sup>2</sup> Source: *ibid.*

<sup>3</sup> See e.g. <https://www.mturk.com/mturk/welcome>

<sup>4</sup> Source: Eurostat (2007) *Community Survey on ICT usage in households and by individuals 2007*

judged.

Ideas about the value and purpose of formal education have undergone a revolution in this environment. Academic content is no longer a unique selling point, and institutions are rebranding themselves around accreditation, flexibility, and the learning experience. Models of education as a bespoke service to learners are readily available in the e-learning literature and are supported by some of the technical developments that have recently been made (e.g. e-Portfolios, personal competence management systems<sup>5</sup>). As graduates face a period of increasing uncertainty about their employment prospects, they are also looking for opportunities to practice and demonstrate their value to potential employers. In this environment, a first degree is no guarantee of 'graduate' employment, and varieties of postgraduate CPD are booming. Finally, an increasingly complex landscape of post-16 provision is hastening modularisation and standardisation of qualifications. All of these trends are promoting a more competence-based approach to the curriculum, in which notions of literacy have more purchase.

The nature of **knowledge** is changing, so that what counts as useful knowledge is increasingly biased towards what can be represented in digital form, and/or applied to immediate problems and situations. Many scientific and research enterprises now depend on data being shared in the almost instantaneous fashion enabled by the Internet, while the sheer processing power available to researchers is ushering in new methods of investigation and in places whole new disciplines and genres of knowledge. At the same time as digital scholarship progresses, the rewards and recognition for scholarship become less certain. The outcomes of creative and intellectual work are more freely available than ever before, the logic of many market sectors is towards openness and collective knowledge bases, and conflicts over intellectual property, access and licensing are becoming acute.

The texture of **social life** is changing, with more and more people conducting and sustaining relationships via digital media. Many social practices, from purchasing to voting to registering for healthcare, can now be conducted online. In its recent statement on 'Digital Britain'<sup>6</sup>, the Government expresses an active intention to enhance this trend, and lists 'media literacies and IT skills' second only after access to the internet as a requirement for building a society of 'empowered and informed consumers and citizens'.

Trends shaping technology and community, from Wenger et al (2005), are:

- Fabric of connectivity – always on, virtual presence
- Modes of engagement – generalised self-expression, mass collaboration, creative re-appropriation
- Active medium – social computing, semantic web, digital footprint
- Reconfigured geographies – homesteading of the web, individualisation of orientation
- Modulating polarities – togetherness and separation, interacting and publishing, individual and group
- Dealing with multiplicity – competing services, multi-membership, thin connections
- New communities – multi-space, multi-scale, dynamic boundaries, social learning spaces.

In a related fashion, **communications and media** are changing profoundly and rapidly, with the new social media and gaming technologies being embraced by innovative educators (Martin & Madigan, 2006, Lankshear & Knobel, 2008). However, whilst the forms of communication and media are clearly significant in shaping thinking and knowledge work, recent research on learners has suggested that their engagement with digital media is more complex than the 'digital natives' discourse would imply (Bennet et al., 2008, Hargittai & Walejko, 2008). In this space, the idea of multimodal literacy (Kress and Van Leeuwen, 2001), understood as a complex set of critical and social practices, has largely replaced the discourse of 'learning styles' (e.g. Kolb, 1984, Honey and Mumford, 1982), which tended to imply a fixed set of capabilities or preferences on the part of the individual. A *critical* engagement with ideas in different media, once an aspect of specialist courses such as media studies, is becoming understood as an

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<sup>5</sup> <http://www.tencompetence.org/>

<sup>6</sup> [http://www.culture.gov.uk/reference\\_library/media\\_releases/5548.aspx](http://www.culture.gov.uk/reference_library/media_releases/5548.aspx)

essential skill for navigating the information age, at the same time as novice learners' *lack* of criticality is being widely lamented.

Closely related to this last point, **literacy practices** are changing. Writing has moved from a paper-based to a largely screen-based medium (Kress, 2003), and associated searching and editing software have profoundly changed the way in which writing is typically constructed (Cushman, 2004). Images and video are also increasingly used to access and communicate knowledge (JISC/British Library, 2008). Collective intelligence and amateurisation are key terms for the new ways knowledge is being constructed through social media.

Changing **technologies** are dealt with in more detail in the futures section below, but present trends include:

- Institutional technologies giving way to learners' personal technologies and personal access to third party (or 'public') services
- Large-scale, stable applications giving way to small scale apps and services, some in constant beta mode
- Trusted content sources giving way to personal aggregators
- Online articles giving way to blog entries and tweets
- VLEs giving way to learner-owned or -shared spaces for collaboration and knowledge building

All this places much greater onus on learners to choose, use and manage their own technologies, develop their own working spaces and practices, and find their own learning communities. It also puts enormous strain on institutional ICT support and ICT skills provision. In fact it is clear that institutions are simply not resourced to keep pace with the rate of socio-technical change, such that they can claim to support whatever technologies learners bring into the learning situation. 'We know, we teach you' may no longer work as a paradigm for ICT skills provision.

## 2.3 Future scenarios

Having examined current trends, this section scans the further horizon to consider possible future requirements for literacy, competence and learning. The resources reviewed here took different approaches to future thinking, and had different remits in terms of scope and coverage. While much of the work of these projects has been speculative, this review is limited to the trends identified as significant for future thinking by at least two studies.

For each trend identified as of interest to this review, possible implications for learners' skills, literacies and dispositions are explored. This section, and the interpretations made of source documents, is intentionally speculative.

### Resources reviewed for this section:

- Challenge summaries from Beyond Current Horizons (2008/09, UK, all sectors, lookahead 2025)
- Educause Connect report 2008 (2008, US/global, all sectors, lookahead 5+ years)
- Reports from the Open University's 'Open Thinking on HE' (2008, UK, HE, lookahead 10 years)
- OECD Schooling Scenarios (2008, international, schools, lookahead 2020)
- Learning2.0: The Impact of Web2.0 Innovation on Education and Training in Europe (2008, Europe, all sectors + training, lookahead unclear)
- e-Skills UK Technology Counts: IT and telecoms insights (2008, UK, FE/HE/employment, lookahead 3-5 years)

Trend	Skills/literacies/dispositions
<b>Open University 'Open thinking on HE' seminar series</b>	
<p>The knowledge society demands:</p> <ul style="list-style-type: none"> <li>• broadening of curriculum (less discipline-bound)</li> <li>• students' approaches to learning being actively developed</li> <li>• learning how to (continue to) learn</li> </ul> <p>The knowledge society likely to mean:</p> <ul style="list-style-type: none"> <li>• legitimisation of knowledge as use-value rather than based on established protocols and methods, values of 'truth' etc</li> <li>• distributed sites of learning (including the workplace)</li> <li>• rhetoric of high skill economy -may hide restratification of middle class work, high performance anxiety</li> </ul>	<p>Interdisciplinary thinking learning to learn eclectic methodologies persuasive and rhetorical skills capacity to make sense of experience in multiple contexts</p>
<p>Globalisation/internationalisation of HE: features</p> <ul style="list-style-type: none"> <li>• Physical mobility (students and scholars)</li> <li>• Recognition of prior study across national boundaries</li> <li>• Other modes of knowledge transfer (collaborative research, transnational education)</li> <li>• Internationality of teaching, learning and research</li> <li>• International orientations and attitudes</li> </ul>	<p>Globally recognised qualifications: capacity to present achievements in globally recognised ways 'International' orientation and attitude Capacity to collaborate across national and cultural boundaries Mobility (cultural, geographical)</p>
<p>Democracy and social justice: aspirations OECD (2006): 'promote democracy, tolerance and social cohesion' IAU (2005): 'instill ...the critical thinking that underpins responsible citizenship' CoE (2006): developing 'democratic culture', 'active citizenship' and 'well-being of whole society', 'human rights and social dialogue'</p>	<p>Citizenship education Social participation Social innovation</p>
<b>Beyond Current Horizons pre-determined elements of future scenarios</b>	
<p>Population ageing</p>	<p>Maintain good health throughout life Maintain interest in learning throughout life</p>
<p>Climate changing</p>	<p>Assess and address environmental threats Resilience</p>
<p>Ever greater facility to connect to knowledge, resources, people and tools, and to gather, store and examine data Better systems/practices for working together at a distance, facilitating globalisation of economic and social life More porous boundaries between working and learning, and between working and personal life Decentralisation of technology with systems organised around individual rather than institution More devolution of responsibility to machines and computer systems, with implications for 'human' work roles Location increasingly important in terms of the technological systems available, governance of systems, and the way in which virtual and physical information is merged. Drugs which enhance cognitive functioning for limited periods of time will continue to be available – poss of other kinds of cognitive enhancement</p>	<p>Connect with knowledge, resources, people and tools as required Gather, manage and analyse data (ubiquitous, epic scale) Work at a distance and across cultural/national boundaries Manage work/life balance Take personal responsibility for technology systems Work in networks of expertise with other humans and ICT systems Create and manage own virtual/physical spaces Understand and manage own cognitive processes Act to preserve health of the environment, the body, and society</p>

<b>E-Skills Technology Counts emerging trends</b>	
<p>Industrialisation of technology delivery and business transformation through ICT  Security and data protection  Communications convergence  Innovation at a premium  Outsourcing, geo-sourcing, automation and commoditisation  Green IT  Convergence of home/work/college ICT systems  Peer-to-peer networks</p>	<p>Analyse, design and develop technology-enabled projects  Broad business skills e.g. analytics  Maintain personal and organisational data security and integrity  Manage voice, text, data, video, location information  Develop and deploy high level expertise: ongoing self-development and re-invention  Assess and address environmental concerns  Manage work/life balance  Be informed ICT consumer and user  Participate in and understand dynamics of social networks</p>
<b>European Project on Learning 2.0: opportunities/features of Learning 2.0</b>	
<p>Building on distributed knowledge  Enabling peer learning  Supporting the development of interest groups, communities of practice, and learning communities  Creating innovative collaborative tools and dynamics  Allowing learners to generate new learning contexts (and not only content)  Providing tools that enhance self-organisation and autonomy and 'just-in-time' learning  Undermining the importance of curricula and syllabi in favour of learning pathways  Enhancing the importance of identity construction within the learning path  Lowering the barriers between formal and informal/non-formal learning, school, home and work</p>	<p>Collaborative knowledge-building  Learn from others and support others' learning  Group participation and facilitation  Generating new learning contexts and dynamics  Self-organisation, autonomy  Identify own learning needs and develop learning pathways  Construct and reflect identities  Manage work-life balance</p>
<b>Educause Connect Report 2008: Significant Trends</b>	
<p>The way we work, collaborate, and communicate is evolving as boundaries become more fluid and globalization increases  Access to—and portability of—content is increasing as smaller, more powerful devices are introduced  Data mashups will transform the way we relate to and share information  Social operating systems will support whole new categories of applications that organize our work and our thinking around the people we know.  Educational applications will make explicit and implicit use of collective intelligence  Mass amateurisation will change/challenge forms of scholarship</p> <p>Megatrends (beyond 5 years):  Collective generation of knowledge</p>	<p>Communicate and collaborate across boundaries  Marketable high-level skills for global knowledge networks  Digital scholarship, digital research  Access content anywhere, anyhow, and repurpose/reaggregate on the fly  Develop networks, project reputation, manage identity  Participate in networks of knowledge and expertise incorporating non-human actors</p>

Connecting people through the internet Moving computing into 3 dimensions	
<b>OECD Schools of the Future</b>	
2a 'The focus of learning broadens with more explicit attention given to non-cognitive outcomes, values and citizenship. ' 2b 'widespread development of specialisms ... Flourishing research on pedagogy and the science of learning' 3a 'learning for different cultures and values through networks of community interests. Small group, home schooling and individualised arrangements become widespread' 3b 'learning is importantly determined by choices and demands ... strong focus on non-cognitive outcomes and values'	The OECD scenarios are intended as alternative future paradigms but it is interesting that non-cognitive outcomes, cultural awareness, values and citizenship are key attributes that emerge across several of them.
Both OECD and BCH envisage different literacies and learning practices being required in different political and social scenarios, e.g.: 1. Competitive, market-led education system (outcomes-led, economic models of accountability) 2. Personalised, humanist model of education (process-led, discourse of personal development) 3. Socialised, collective model of education (values-led, collective responsibility) It is easy to imagine that technologies as well as social practices would develop differently in these three scenarios.	

**Table 2.2 Future scenarios**

**Common capabilities** that may be required to cope with a range of future scenarios:

- Manage work/life balance, particularly as technologies erode the boundaries between work, leisure and learning, between home, school and workplace.
- Social entrepreneurialism – the capacity to understand how social systems work, innovate within systems, and adopt roles flexibly and strategically
- Develop and project identities, manage reputation (cf Owens et al 2007)
- Communicate and collaborate across national and cultural boundaries, using a variety of technologies and media
- Contribute to knowledge and understanding in hybrid networks of people and non-human cognitive agents
- Manage career path, learning path and professional development
- Exercise judgement and expertise, bring knowledge to bear
- Act safely, ethically and responsibly in environments where public and private are being redefined
- Reflect, plan, seek support, learn from situations and from others
- Assess and address threats to health and to the environment
- Exercise multiple modes of meaning making (cf. Kress, 2003)

Some future scenarios may prove to be **paradigm-breaking** for literacy provision and formal education more generally. For example:

- 'Study skills' and 'academic practices' acquired through formal learning may become (perceived to be) less and less relevant to the just-in-time, self-directed learning demanded in high-pressure working environments
- Academic knowledge and ways of knowing, e.g. peer review, acknowledged authorship, and methods associated with specific disciplinary traditions, may also become (perceived to be) irrelevant in a society focused on the use-value of knowledge in immediate contexts
- Ubiquitous digital image and voice capture devices, high quality voice recognition and means of analyzing sound and video files, may make the text-based practices of formal learning obsolete, and challenge the values of a largely text-based accreditation system
- Online reputation may become more valuable to the individual than formal qualifications or accreditation

- ICT skills may become so general in society, and digital tools so intuitive to use (highly wearable, interoperable, customizable) that the idea of 'learning' or accrediting such skills beyond the kindergarten becomes untenable
- Like other cultural resources, digital resources may become so differentially available to individuals and families, at so early an age, that formal education can do little to redress the inequalities

None of the studies cited consider these paradigm breaking scenarios likely. They are included as tools for thinking about the directions education might or could take, in the area of digital literacies provision.

## 2.4 Recent studies into learning and digital literacies

The **REVEEL project**<sup>7</sup> was funded to consider "How compelling is the evidence for the effectiveness of Post-16 e-learning?" It concluded that '*we are now learning in technology-rich societies and need to remodel education as lifelong learning.*' Learners therefore need to develop a 'learning literacy' defined as:

- The ability to self-manage the learning process,
- The capability of negotiating learning outcomes,
- Time to review and reflect on the learning process whilst learning,
- Finding and evaluating the use of a wide-range of digital and non-digital resources,
- The ability to share and develop this learning literacy with others

Technology, and particularly engagement with social technologies for informal learning purposes, was seen as contributing to the development of this literacy.

**Literacies for Learning in Further Education**<sup>8</sup> looked at the literacy practices of learners' everyday lives, and concluded that these were generally:

- *Multi-modal.* On the whole, students reading and writing combines the use of symbols, pictures, colour, music, etc.
- *Multi-media.* Students' uses of literacy combine the uses of paper-based and electronic media.
- *Shared.* For example, they tend to be interactive, participatory and collaborative.
- *Non-linear.* For example, different reading paths are taken through a text - dipping in to sections, flicking through, finding relevant bits - rather than following a linear route from the beginning to the end of the text.
- *Agentic.* Students tend to have responsibility within these practices.
- *Purposeful* to the student.
- Have a *clear sense of audience.*
- *Generative* - involving sense-making and creativity.
- *Self-determined* in terms of activity, time and place

The strong implication was that support for the development of more formal literacies for learning should be designed along similar lines. A formal paper published from these findings (Mannion et al., 2009) concludes that: '*contexts and their associated literacies are co-emergent and co-determined by each other, [therefore] literacy skills do not simply 'transfer' between contexts*'. An effective, 'critical' literacy pedagogy should '*pay respect to students' everyday literacies as a valuable resource base in formal coursework*'.

<sup>7</sup> <http://www.reveel.sussex.ac.uk/>

<sup>8</sup> <http://www.lancs.ac.uk/lflife/description/index.htm>

**Next Generation User Skills: Working, Learning and Living Online in 2013**<sup>9</sup> asked whether new 'web 2.0' methods of communicating, collaborating and contributing would become the core skills for 2013. Arguing that this may well be the case, the study then considered whether the current education system and its qualification frameworks were fit for purpose, assuming the purpose to be 'harness[ing] the native ICT capabilities of young learners' and turning these to lifelong learning and workplace skills. It concluded that this would depend on several factors:

- Do the behaviours of digital natives fit the purposes of education and employment?
- Are teachers and lecturers across subject areas capable of supporting and adding value to such ways of working?
- Are they compatible with curriculum design and assessment methods?
- Will the risks be surmountable in terms of safety, quality and other ethical issues?

This report can thus be seen as paralleling our own study process, albeit in a schools context and with a clearer commitment to employability as the main purpose of education. It usefully highlights the difficulty of anticipating future requirements, since tools and services, general (non educational) socio-technical practices, demand for different kinds of qualification, and changing social/economic values are all complex and interdependent systems.

A key challenge identified in the current situation is that qualifications and awards are almost always structured into silos, and focus on short-term, measurable outcomes. What this report calls 'workflows' around technology, and what we might call technical practices, are highly interdependent and may evolve over a long timeframe. So, for example, a capacity to choose between social, media and business software to solve a particular problem is a capacity that evolves with experience across multiple contexts.

**OfCom's Media Literacy Audit** (2008)<sup>10</sup> found that:

- Enthusiastic take-up of new media by young people was not necessarily accompanied by an understanding of how new media content is produced, i.e. by a capacity to read it critically, or play a role in collaborative co-creation.
- Their confidence in using the internet is similarly not complemented by critical thinking or appropriate care in use of web sites, potentially exposing them to risks relating to unsuitable material or abuse of their personal information.

This study noted an increase in use of multiple devices for accessing media content, again with young people at the forefront.

The UK Government's Draft **Digital Britain Report** (Jan 2009) notes the contested nature of the term 'media literacies' but includes and values the concepts of critical 'reading' and creative (co) production. The report identifies a wide range of agencies with a potential role to play in fostering media literacies, of which educational institutions are only one. The media itself, the arts, libraries, museums and galleries, and local communities are also important actors in this arena.

The key elements identified by the government as fostering 'digital engagement' are digital inclusion, digital life skills, and digital media literacy. These are placed in a continuum with the clear implication that media literacy is a higher-level capability, built on access and skills.

**Digital Literacies in the Lives of Undergraduate Students: Exploring Personal and Curricular Spheres of Practice**<sup>11</sup> working in the 'literacies as social practice' area of the research landscape, reports on ethnographic findings from 45 undergraduates. Jones and Lea found:

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<sup>9</sup> [http://www.sqa.org.uk/sqa/files\\_ccc/HNComputing\\_NGUSReport\\_NextGenerationUserSkills.pdf](http://www.sqa.org.uk/sqa/files_ccc/HNComputing_NGUSReport_NextGenerationUserSkills.pdf)

<sup>10</sup> [http://www.ofcom.org.uk/advice/media\\_literacy/media\\_lit\\_digital\\_britain/](http://www.ofcom.org.uk/advice/media_literacy/media_lit_digital_britain/)

<sup>11</sup> Jones S. and Lea M.R. (2008), *EJEL* 6 (3) 207-216: <http://www.ejel.org/Volume-6/v6-i3/JonesandLea.pdf>

- A tendency to segregate personal and curricular 'texts' (though the separation was not absolute and students showed different personal preferences in this regard)
- Institutions forced to forward communications from VLE (institutional, curricular technology) to personal email addresses because students did not check the former, or not frequently.
- Wrt group work '*participants have to engage with a range of literacy practices. Their communication can be as informal as the Instant Messenger communication suggests, but the group reports they produce have to comply with institutional and disciplinary conventions, engaging in a range of practices common to the production of academic texts. Participants described their textual activities as drafting, critiquing, developing further text, inserting diagrams and doing research*'

The **DigEuLit** project, as summarised in Martin and Grudziecki's paper *Concepts and Tools for Digital Literacy Development* (2006)<sup>12</sup> provides a useful model for thinking about levels of literacy:

*Level one: digital competence (skills, concepts, approaches, attitudes, etc.)*

*Level two: digital usage (professional/discipline application)*

*Level three: digital transformation (innovation/creativity)*

Working with the JISC-funded **Learners' Experiences of e-Learning** programme<sup>13</sup>, Beetham and Sharpe have espoused a pyramid model of developing digital competence which, like Martin and Grudziecki, builds on basic access and skills, through practices and strategies, to 'creative appropriation' of technologies for personal development, personal styles of participation in learning, and the achievement of personal learning goals.

This programme has just completed its second phase and reports many findings of relevance to this study, based on research among HE and FE students in the UK. Among them:

- Technology is integral to learners' lives: all learning is potentially supported by technology and the term e-learning means little to them
- In their use of technology, students are led by tutor recommendations and course requirements. They expect tutors' use of technology for learning to be pedagogically appropriate and skillful.
- Quality academic digital content is regarded by learners as a significant benefit of F/HE: they become significantly more adept at using it as they mature in their studies
- Learners want meaningful choices about how they learn, with and without ICT
- Many learners use technology to multi-task while some find being online a distraction from study
- Among novice learners at least, only a small minority actively explore and investigate the potential of software or technologies
- (However) some learners, including many disabled learners, are agile adopters and explorers of technology
- Learners are attached to their technologies, emotionally and in terms of personal organisation and practice: they benefit from being able to use personal technologies and access personalised services in institutional contexts
- Learners are creating their own learning spaces, blending virtual with face-to-face, and formal with social. Informal collaboration is widespread, often facilitated by technology that is under learners' ownership and control
- Learners have different attitudes to learning in the public/private spaces of social networks
- Despite their facility with personal technologies, learners often lack skills in using technology to support learning. This can be true even after considerable time at college.
- The Internet is the first port of call for information: sites such as Google and Wikipedia are typically referred to before academically approved resources.
- Students value ICT-based activities that support reflection, meta-learning, practice and revision

<sup>12</sup> [www.ics.heacademy.ac.uk/italics/vol5iss4/martin-grudziecki.pdf](http://www.ics.heacademy.ac.uk/italics/vol5iss4/martin-grudziecki.pdf)

<sup>13</sup> <https://mw.brookes.ac.uk/display/JISCle2/Home>

- Learners display enormous differences in past educational experiences, needs, and motivations. These have a profound influence over their preferred strategies for using technologies
- Many learners, particularly proficient e-learners, are used to learning and accessing knowledge via images and video.

This programme has also produced a range of more detailed findings about how learners 'mature' in their studies, and in particular their use of technologies for learning, and about strategies of 'effective' e-learners.

The **JISC/British Library 'Google Generation' report** (2008)<sup>14</sup> highlighted that:

- although young people demonstrate an ease and familiarity with computers, they rely on the most basic search tools and do not possess the critical and analytical skills to assess the information that they find
- research-behaviour traits that are commonly associated with younger users – impatience in search and navigation, and zero tolerance for any delay in satisfying their information needs – are now the norm for all age-groups

It called on the Government to urgently consider its findings: '*well-funded information literacy programmes are needed if the UK is to remain as a leading knowledge economy with a strongly-skilled next generation of researchers.*

**Learning from Digital Natives (Gcal)** largely confirmed Bennet et al's (2008) work in Australia and findings of the Learners' Experience programme in its second phase, that:

- the phrase 'digital natives' does not do justice to the complexity of learners' diverse experiences with technology and study
- different approaches and attitudes to digital research are not strongly generational but are correlated with factors such as social background and context of study
- learners are conservative in their attitude to adoption of new technologies. They are highly influenced by their tutors and courses and expect the use of digital technologies in course contexts to have an educational rationale

Since 2007, **Becta** has undertaken a range of activities (research, evidence-gathering and opinion-forming) aimed at characterising the '**e-maturity**' of individuals and organisations. A synopsis of work under the individual strand<sup>15</sup> suggests that the e-mature learner demonstrates:

- Experience: sufficient experience with effective uses of technology and with problem-solving.
- Confidence: either faith that the technology can't be broken (naïve) or the confidence that it can be fixed. A 'can do' attitude that is willing to explore what is possible, what doesn't work and why. This confidence will be based on previous successful use of technologies to achieve their goals.
- Self-direction: the ability to be pro-active, to use trial and error, to experiment, establishing what works and what doesn't.
- Creativity: the ability to imagine new, innovative and/or valuable uses for technologies.
- Discernment: the ability to choose which technology is appropriate and when it is not appropriate to use a particular technology. Additionally an e-mature learner understands that everyone potentially has a voice, but not everyone is honest or wise. Ideally, there is also an understanding of how beliefs are forged, giving the ability to evaluate claims and attitudes.
- Emotional maturity: for example, responsiveness to the needs of others and the ability to see the big picture.

In addition, the report characterises progression in e-maturity as the development of self-confidence, self-reliance and independence in learning. It concludes that the role of the e-mature teacher is critical in

<sup>14</sup> <http://www.jisc.ac.uk/whatwedo/programmes/resourcediscovery/googlegen.aspx>

<sup>15</sup> <http://e-maturity.wetpaint.com/page/E-maturity+Library+-+Learner>

facilitating this development.

In 2005 the European Centre for the Development of Vocational Training produced a prototype **Typology of knowledge, skills and competences**<sup>16</sup> for use across the EU. The accompanying report – credited to CEDEFOP - traces the rise in outcomes-based conceptions of learning and assessment, particularly in the vocational/work-based learning sectors but also in FE and HE, and the associated progress towards standardisation of competence definitions across the EC. In HE this has culminated in the Bologna accord, which promotes a single framework for describing higher qualifications. The focus on competence both allows transferability of credit across national boundaries, and allows individuals to integrate their formal and informal learning experiences.

This report distinguishes 'functional' accounts of competence, emphasising separate attributes and skills, with 'interpretative' accounts, emphasising how individuals understand and approach a task. It also summarises evidence that skills and competences are not highly generalisable or transferable across contexts. In a review of policy and provision across the EU, it reports that the UK government has adopted a functional approach with a focus on individual skills/capabilities, though employers and professional bodies tend to favour a more behavioural approach, i.e. the demonstration of (a particular standard of) performance on work-based tasks.

JISC projects **SPLASH** and **Isthmus** have highlighted the value in students having access to personal and social technologies, and creating their own personal learning blends, in institutional contexts.

**Project Information Literacy** (US) has produced a number of research reports including Head and Eisenberg (2009) Students find academic research challenging: '*Finding contexts for “backgrounding” topics and for figuring out how to traverse complex information landscapes may be the most difficult parts of the research process.*'

## 2.5 Implications: 'pinch points' for learning literacy provision

There is evidence from some of these projects that current institutional provision is under stress, though it must be emphasised that most of the studies reviewed in this chapter do not provide detailed evidence about different kinds and outcomes of provision. Points of actual or potential stress include the following:

**Information skills, evaluative skills, critical skills** (Google Generation, LXP, PIL, Learning from Digital Natives, ReVEEL, Digital Britain)

Strong and credible evidence that learners require support for online research skills and critical/evaluative approaches to information; also that they over-estimate their own capabilities and are naïve about the provenance and purpose of messages in digital media.

**Induction and ongoing support for use of technologies for learning, use of personal technologies for learning** (LXP, Learning from Digital Natives at Gcal)

Strong evidence from UK-based programmes that learners require support in migrating to more ICT-based study practices in HE and FE, and in using subject-appropriate technologies for deep learning.

Evidence that learners benefit from being able to use their own technologies for learning, including software and services, and that in some institutions this is problematic  
Indications that support for learners ICT skills needs to move from 'training' on institutionally provided technologies to more tailored support for the technologies learners choose or are constrained to use – which can be peer-led (e.g. student help desks, study 'buddies')

**Induction and pre-induction** (TESEP, LXP)

Evidence that technologies can be used to extend the process and period of induction well before

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<sup>16</sup> [www.ecotec.com/europeaninventory/publications/method/CEDEFOP\\_typology.pdf](http://www.ecotec.com/europeaninventory/publications/method/CEDEFOP_typology.pdf)

students actually arrive at college/university, and help to ease social transition. This is also a critical window in which expectations about study practice can be communicated.

**Research skills** (Google Generation, PIL)

Evidence from the US but born out in UK studies that learners lack general research skills, that moving to third year and postgraduate study can be a source of difficulty, and that 'digital scholarship' should continue to be an element of the curriculum throughout study and not confined to first year modules.

**Tutor skills** (Becta, LXP, Digital Natives)

Learners are still strongly led by tutors in choosing and using technologies for learning: course practices become personal norms

Learners expect digital technologies to be used consistently in their programmes of study, and with a clear educational rationale. They will vote with their feet if course provision does not meet their expectations

Tutors skills and confidence with technology are therefore critical to learners' development

**Plagiarism, originality and authority, intellectual property**

Indications that there is a clash of knowledge cultures, emerging particularly around issues of plagiarism and originality in student writing.

**Confidence, criticality and curiosity about technology** (LXP, Digital Natives)

Evidence that despite an apparent facility with technology, most learners use only basic functionality and are reluctant to explore the capabilities of technology, take risks with their study practices, or make critical and reflective choices about technology use.

**Feedback and assessment** (REAP)

Evidence that students are often dissatisfied with the feedback and assessment process, which may indicate a lack of understanding of academic expectations, and again a contest over knowledge values. Little evidence of feedback being used as a mechanism for learning development.

**Integration/interpretive approach to literacies** (DigEULit, CEDEFOP)

Evidence that HEIs, under the influence of the UK Gov's transferable skills agenda, have taken a functional approach to literacies under the assumption that individual skills are highly transferable across contexts. Either a more behavioural/professional approach (i.e. focus on deployment of personal capabilities in specific task contexts) or an interpretive approach (i.e. focus on how individuals understand tasks and how social contexts support that understanding) – or (CEDEFOP) an approach drawing on the strengths of both - would be more effective.

**Practice in UK HEIs and progress in European standardisation, including the Bologna accord** (CEDEFOP)

The Berlin Communiqué of 2004 (Bologna working group on Qualifications Frameworks) requires member states to move towards defining higher qualifications in terms of 'workload, level, learning outcomes, competences and profile'. However, most UK HEIs define their degree programmes (for the purposes of credit transfer) primarily in terms of workload, level, and knowledge.

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