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Thriving in the 21st century: Learning Literacies for the Digital Age (LLiDA project): Executive Summary, Conclusions and Recommendations

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Contents

Executive summary

Aims

The LLiDA project set out to
- review the evidence of change in the contexts of learning, including the nature of work, knowledge, social life and citizenship, communications media and other technologies
- review current responses to these challenges from the further and higher education sectors, in terms of:
    - the kinds of *capabilities* valued, taught for and assessed (especially as revealed through competence frameworks);
    - the ways in which capabilities are supported ('*provision*')
    - the *value* placed on staff and student 'literacies of the digital'
- collect original data concerning current practice in literacies provision in UK FE and HE, including 15 institutional audits and over 40 examples of forward thinking practice
- offer conclusions and recommendations, in terms of the same issues reviewed in 2

Review of evidence

Key messages from the background review include the following:

- Learners can, under the right conditions, become more critical, evaluative, self-aware, self-confident, skilled and capable in the use of technologies
- Learners can also, under the right conditions, 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 within authentic tasks and as needed are better retained than those taught one-off, in isolation, and through instruction.
- 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.

Key messages from the review of future learning scenarios are that educational institutions must adapt to help students deal with:
- economic uncertainty
- high competition for employment in the global knowledge economy
- increased levels of alternative, contract-based and self-employment
- the rise of interdisciplinarity and multi-disciplinary teams focused on specific tasks
- a networked society and communities
- multi-cultural working and living environments
- blurring boundaries of real and virtual, public and private, work and leisure
- increasingly ubiquitous and embedded digital technologies
- increasing ubiquity, availability and reusability of digital knowledge assets
- distribution of cognitive work into (human and non-human) networks of expertise
- rapid social and techno-social change

Capabilities which are likely to be required across a range of future scenarios include:
- Manage work/life balance, particularly as technologies erode the boundaries between work, leisure and learning, between home, school and workplace.
- Social entrepreneurlaism – 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, SeelyBrown 2005, Siemens 2004 and 2006)

Recent studies of digital and learning literacy provision suggest the following challenges and pinch points:

- Learners' information literacies are relatively weak but learners have little awareness of the problem
- There is poor support for learners' developing strategies to make effective use of technologies for learning, and in some institutions there are still barriers to use of personal technologies and social networks
- Learners require intensive support in migrating to more ICT-based study practices, particularly at transition points such as course selection, induction, final year preparation, move to post-graduate study
- Many learners lack general critical and research skills: 'digital scholarship' is poorly communicated and modelled in many subject contexts
- Learners' different approaches, attitudes and experiences of technology represent a new form of diversity which institutions must address to ensure equity of access
- Most learners use only basic functionality and are reluctant to explore the capabilities of technology
- Most learners are still strongly led by tutors and course practices: tutor skills and confidence with technology are therefore critical to learners' development
- There is a potential clash of academic/internet knowledge cultures, emerging particularly around issues of plagiarism, assessment, and originality in student writing.
- Students are often dissatisfied with the feedback and assessment process, and it is rarely used as an opportunity to further the development of self-awareness and literacies of learning
- There is often insufficient opportunity and motivation for learners to integrate literacies in authentic tasks
- Tutors are still insufficiently competent and confident with digital technologies for learning, despite evidence that learners are strongly influenced by their example
- Institutions need to respond to external agendas such as European harmonisation, the demand for higher skills, and demographic shifts in the learning population

Summary of the LLiDA '**Framework of Frameworks**' for analysing the components of digital and learning literacy (or capabilities leading to effective learning for a digital age)

High-level terms, framing ideas	Component competences
Learning to learn, metacognition	Reflection Strategic planning Self-evaluation, self-analysis Organisation (time, etc.)
Academic practice, study skills	Comprehension

	Reading/apprehension Organisation (knowledge) Synthesis Argumentation Problem-solving Research skills Academic writing Specific subject discipline skills as appropriate
Information literacy	identification accession organisation evaluation interpretation analysis synthesis application
Communication and collaboration skills	Teamwork Networking 'Speaking' and 'listening' skills (see below for different media)
Media literacy (also 'visual' and 'audio' and 'video' literacies)	Critical 'reading' Creative production
ICT/digital/computer literacy	Keyboard skills Use of capture technologies Use of analysis tools Use of presentation tools General navigation/UI skills Adaptivity Agility Confidence/exploration
Employability	Self-regulation Teamworking Problem solving Business and customer awareness Innovation/enterprise
Citizenship	Participation and engagement Ethicality/responsibility Political, social, personal responsibility

Selected findings from the research studies

Due to a lack of clear ownership at institutional level, learning and digital literacies are rarely the basis of an integrated institutional strategy. Effective integration can be provided where the Learning and Teaching Strategy addresses learning in the digital age directly, prioritises innovation in programme design, and establishes clear lines of action/responsibility to other strategies such as ICT, Quality, Employability, e-Learning, Learning Resources and devolved faculty/department and service-level strategies. An institutional literacies champion should be capable of initiating action in both the digital and the academic/learning development area of institutional provision, and of working across the curriculum teams/central services boundary.

Institutions have to prepare themselves, and not just their learners, for an uncertain future. Among the

paradigm-breaking scenarios considered in this study, an increase in contract-based and self-employment giving rise to a loss of confidence in formal qualifications is perhaps the one that should give institutions most cause for concern. Institutions must position themselves to respond quickly and flexibly to the need for new kinds of capability, and to recognise and represent graduate capabilities in new ways.

Our study found consistent good practice in central provision for the three areas of academic/learning literacy, information literacy, and ICT skills. Staff in these areas have their own well established cultures, frameworks and forums for sharing professional practice. In many cases these cultures include a focus on learners as individuals, with their own preferred approaches and particular needs. A systemic problem is that staff working in these areas are still operating in relative isolation from one another, and – in many cases – from staff in academic departments too. Support is most effectively integrated where there is an institution-wide policy of assessing and progressing learners' skills. In FE this is usually delivered around guidance tutorials, while in HE the availability of an e-portfolio system can be the catalyst and focus of provision. ,However, even these good examples are not sufficiently far-reaching. In addition, students' digital and learning literacies need to be assessed and supported as they engage in academic tasks, and they need to be equipped with the habits – including reflection and peergroup support – that will allow them to improve their learning strategies throughout life.

Employability is often the stated rationale for an integrated approach. However, careers staff were difficult to reach in our study, and although 'employability' extends beyond careers, we draw a tentative connection between the lack of engagement with the 'literacies' agenda by careers staff and a tendency for 'employability' itself to be poorly articulated and supported. There is a need for further work to extend perceptions of employability beyond conventional careers services to include approaches to learning, programme design and engagement with employers.

Librarians have a long tradition of supporting literacies and working with academic departments. One problem, though, is that where librarians have championed the digital aspects of information literacy, this is regarded as having 'solved' the problem of the digital in learning. Our study found very little central support for media literacy, including critical aspects of reading different media and creative practices of media production. There was also very little mention of communicating and sharing ideas either as an aspect of information literacy or in its own right. Effective learners require both of these, and other digital capabilities such as navigating virtual and immersive worlds, managing digital identities and reputation, and using digital technologies for reflecting, planning and making sense of their learning experiences. While librarians can be regarded as pioneers in articulating the impact of digital technologies on their area of expertise, and adapting their practices of support, digital literacies cannot be left to librarians if they are to be embedded throughout the institution.

There is great diversity in the literacies mandated for consideration during the curriculum design and validation process. We identified three modes of integrating literacies:
- Institution-wide programme (usually portfolio-based) with generic processes of review and reflection, but the specific skills practised and assessed in subject modules
- Skills modules or module components, delivered alongside 'subject' teaching, typically by central services staff: may include tailored (subject-specific) tasks or examples
- Literacy provision fully integrated into modules and/or programmes of study, including learning outcomes and assessment: typically in professional/vocational programmes that are already competence-based (but in one case via the tutorial system).

The great majority of our examples across all modes came from vocational and professional courses, and there is plenty of evidence that these are the subjects spearheading support for literacies in the curriculum.

Much excellent practice in disciplines was not visible to our study methods. Many literacies are so deeply and tacitly embedded in subject teaching that academic staff do not identify their practice as literacy-based at all. Examples might be visual literacies in art, or critical media literacies in media studies. Recognising that different subjects can contribute expertise in different literacies for learning is a first step

towards finding and sharing good practice.

Social software is now widely being used to enable peer mentoring and group support, for example around skills workshops, during induction and first-semester studies, on placement, and for group work. Study buddy and student mentor initiatives rarely address digital literacies directly, but could be adapted to do so: student help-desks are common for supporting proficiency with digital devices and networks. All of these approaches are being tried by central service staff with good evidence of success.

Inevitably much peer support takes place under the academic radar, but academic staff can help by being explicit about what kinds of collaboration are appropriate, establishing peer review processes, and setting group assignments.

Our findings confirmed and expanded upon the challenges identified in the literature review:
- institutional silos, so learners often have several places to seek help with their learning, and cultural differences can make cross-service/dept collaboration difficult
- (often) poor embedding of literacies into the curriculum, particularly at the level of feedback and assessment
- (often) poor integration of information/digital literacies with academic/learning literacies
- curriculum provision tends to be one-off and cohort-based, rather than based on an ethos of personal development: central provision is more personal and developmental but rarely reaches learners when they are actually engaged in authentic tasks
- Academic staff perceive students as being more digitally capable than is really the case
- poor self-evaluation by learners, particularly in relation to their information skills, so voluntary services are not reaching those in most need, and skills modules are not perceived as relevant or important

Student expectations, student diversity and employability were the main agendas driving change in provision for learning and digital literacy.

Conclusions and recommendations

Re-articulating the challenge

The challenge we outlined at the start was to transform:
- The kinds of capabilities valued, taught (for) and assessed
- The ways in which learners' capabilities are supported and assessed
- The value colleges and universities place on 'literacies of the digital' and the investment they make in staff and student skills

We can now add detail to these three challenges. New capabilities and learning goals must help students to deal with:
- economic uncertainty
- high competition for employment in the global knowledge economy
- increased levels of alternative, contract-based and self-employment
- the rise of interdisciplinarity and multi-disciplinary teams focused on specific tasks
- a networked society and communities
- multi-cultural working and living environments
- blurring boundaries of real and virtual, public and private, work and leisure
- increasingly ubiquitous and embedded digital technologies
- distribution of cognitive work into (human and non-human) networks of expertise
- rapid social and techno-social change

In supporting those capabilities, support staff and curriculum teams must:
- Design flexible learning opportunities
- Situate those learning opportunities, where possible and appropriate, in authentic contexts (workplace, community, placement)
- Design learning opportunities for highly interconnected individuals, operating in distributed networks of expertise
- Continually review how technologies are integrated into curriculum tasks
- Continually review learners' techno-social practices and the practices of professional and scholarly communities (anticipating that these will be different and that helping learners negotiate the differences will become part of the pedagogic agenda)
- Support learners to use their own technologies and to develop effective strategies for learning with technology
- Use assessment and feedback to encourage innovation in learners' approaches to study, rewarding exploration as a process: current assessment regimes often reward conservatism
- Support learners' developing self-efficacy and self-direction in learning, empowering them to navigate increasingly complex learning landscapes
- Support learners' personal reflection, progression and planning, for example by engaging with e-portfolios and learning records

In changing cultures of learning to place greater value on 'literacies of the digital', institutions must
- engage and motivate students to develop learning literacies by"
  - monitoring, supporting and assessing digital competences across the learning experience
  - articulating the educational benefits and importance of digital literacies
  - recognising and rewarding the expertise that digitally proficient students can offer to others in the learning community
  - using rich learner-related data to support portfolio-building, personalised advice and guidance, and where appropriate personal curricula and learning environments
  - enabling learners to record a wide range of achievements and to present rich accounts of their learning history to different audiences
- engage staff in rethinking their practice by:
  - realigning reward structures around innovation in learning and teaching
  - supporting flexibility, stakeholder-responsiveness, and innovation in curriculum design

- making learning development an explicit concern of teaching staff
- fostering digital scholarship and digital professionalism, linked to changes in teaching practice
  - engage employers and other stakeholders:
    - in meaningful dialogue, recognising that the stated needs of graduate employers are only one perspective on employability in a rapidly-changing social and economic landscape
    - in continuous review of the purposes and outcomes of the curriculum

The social and economic agendas of upskilling more of the population, widening participation, and supporting lifelong learning, mean that university and college learners are more diverse than ever before, with a wider range of educational and ICT experience. Since literacy provision ideally starts with learners' existing practices and conceptions, it needs to become more wide-ranging, more flexible, and more pro-active. It also needs to recognise that the process of development will be incremental, and challenging. Learners need scaffolding, direction and modelling in the first instance, followed by practice and personalisation, giving way to unstructured tasks through which they can learn to choose strategies and technologies to suit different situations and their own preferred ways of working.

Institutions are simply not resourced to support all the available technologies and all the individual requirements learners present. Nor would that necessarily be desirable, as it would imply a single model of digital competence rather than the multiple modes of engagement, varieties of digital scholarship, and numerous specialist applications, which characterise the academic experience.

Looking to the future, then, how do we recognise the changing contexts (new opportunities and challenges), bring them into the institution in ways that are accessible to learners, change our teaching and support practices, and help learners transform their practices to become more effective learners, workers and citizens? A new paradigm may be required, in which diverse skills of staff and students are recognised and used as a resource, in more flexible organisational structures.

The paradigm shift:

From	To
We know, we teach you	Learners' digital skills being recognised, rewarded and used as a resource for the learning community
Established methods, based in disciplines	Emerging and mixed methods, interdisciplinary problem spaces
Induction and one-off training model of literacy support	Ongoing review, progression and just-in-time support
Students become 'qualified' in specific kinds of academic knowledge practice	Students need to strategically manage a range of knowledge practices, for different contexts
Technologies are introduced according to the requirements of the curriculum	(Yes, and) the curriculum is continually modified by the impacts of technology in the environment
Disaggregated services, deployed at particular points in the learning cycle (library, ICT, study skills, careers)	Integrated support for students' learning development and different learning pathways
Stable job market, 'employability' has clear features, particularly in specific vocations and professions	Unstable job market: adaptability, resilience, multi-tasking, capacity to exercise judgement and management of multiple roles to the fore
Students typically on two-year (FE) or three-year (HE) programmes of study: ongoing relationship with institution	Students engaged in multiple forms of learning, often while employed and/or attending several institutions: relationships more flexible, short-term and contractual in nature
Modular assessment: focus on achievement within clearly defined curriculum goals	Some cross-modular assessment: focus on self-efficacy and the ability to integrate skills/know-how

Table 1 Features of the 'digital literacies' paradigm shift

Summarising the evidence

In response to this challenge, what is currently being provided by institutions, and what difference is it making to learners?

Institutional policy/strategy

Due to a lack of clear ownership at institutional level, learning and digital literacies are rarely the basis of an integrated institutional strategy. Effective integration can be provided where the Learning and Teaching Strategy addresses learning in the digital age directly, and there are clear lines of action/ responsibility to other strategies such as ICT, Quality, Employability, e-Learning, Learning Resources and devolved faculty/department and service-level strategies. A digital literacies champion should be capable of initiating action in both the digital and the academic/learning development area of institutional provision.

Institutions have to prepare themselves, and not just their learners, for an uncertain future. Among the paradigm-breaking scenarios considered in this study, a loss of confidence in paper qualifications is perhaps the one that should give institutions most cause for concern. Institutions must position themselves to respond quickly and flexibly to the need for new kinds of capability, and to recognise and represent graduate capabilities in new ways.

The two exemplary strategies examined in this study had the following features:
- institution-wide changes to policy, clearly linked to main institutional drivers and priorities
- actions cascaded through a range of institutional strategies e.g. quality, ICT, and practices, e.g. course documentation
- an incremental approach, spearheaded by pilot projects/initiatives, some with external funding
- collaboration between central services and academic staff, principally around...
- course development and review, involving multi-disciplinary development teams, with intensive resourcing
- large central unit (e-learning PLUS academic development) driving policy forward: in both cases with substantial national profile and hybrid teaching/development/research agenda
- ongoing research, evaluation and evidence-gathering about students' experiences with technology and learning
- commitment to understanding the learning experience in a holistic way: 'learning takes place in a technology-rich world'
- building on previous work, treating transformation as a long-term project
- moving people out of their silos, for example by creating hybrid and/or 'roving' roles

Practice in central services

Our study found consistent good practice in central provision for the three areas of academic/learning literacy, information literacy, and ICT skills. Staff in these areas have their own well established cultures, frameworks and forums for sharing professional practice. In many cases these cultures include a focus on learners as individuals, with their own preferred approaches and particular needs. The main problem is that they are still operating in relative isolation from one another, and – in many cases – from staff in departments too. Students' digital and learning literacies are not often enough being assessed and supported as they engage in academic tasks. It is also not often acknowledged that students have many sources of support, including family, friends, social networks and online resources, but that they need help to integrate these into effective personal practices.

Organisational structures, the way in which services are resourced, and service/department cultures – e.g. different modes of supporting students – are all seen as barriers to the effective integration of literacies. One symptom of this in our study was the difficult identifying people who could audit digital literacies provision across the board. Many potential auditors felt that too much relevant practice was hidden from them. It is suggested that librarians, ICT support staff, careers staff, specialist support staff such as WP and accessibility, and learning development staff are not learning effectively from one another and have limited opportunity to do so. From the background review, though not directly from our study, there is evidence that literacies transfer poorly across boundaries, a finding that makes joined-up

support all the more critical.

Strategies often call for cross-departmental working, and we found examples of good integration between information and ICT support, sometimes including learning support, and in other places between academic practice and information literacy. Support is most effectively integrated where there is an institution-wide policy of assessing and progressing learners' skills. In FE this is usually delivered around guidance tutorials, while in HE the availability of an e-portfolio system can be the catalyst and focus of provision. Employability is often the stated rationale for such an approach. However, careers staff were difficult to reach in our study, and although 'employability' extends beyond careers, we draw a tentative connection between the lack of engagement with the 'literacies' agenda by careers staff and a tendency for 'employability' itself to be poorly articulated and supported.

Librarians have a long tradition of supporting literacies and working with academic departments, so there is a large literature describing their practice and well-established mechanisms for sharing it. These include the SCONUL 7 pillars of information literacy, the only framework from our study that had any recognition on the ground. One problem, though, is that where librarians have championed the digital aspects of information literacy, this is regarded as having 'solved' the problem of the digital in learning. Our study found very little central support for media literacy, including critical aspects of reading different media and creative practices of media production. There was also very little mention of communicating and sharing ideas either as an aspect of information literacy or in its own right. Effective learners require both of these, and other digital capabilities such as navigating virtual and immersive worlds, managing digital identities and reputation, and using digital technologies for reflecting, planning and making sense of their learning experiences. While librarians can be regarded as pioneers in articulating the impact of digital technologies on their area of expertise, and adapting their practices of support, digital literacies cannot be left to librarians if they are to be embedded throughout the institution.

Practice in the curriculum
Our audit institutions exhibited great diversity in the literacies mandated for consideration during the curriculum design and validation process. A small number of explicit frameworks were in use, and the language of the 'key skills' agenda remained in evidence, but the majority of institutions seem to have developed an ad hoc approach.

We identified three modes of integrating literacies:
- Institution-wide programme (usually portfolio-based) with generic processes of review and reflection, but the specific skills practised and assessed in subject modules
- Skills modules or module components, delivered alongside 'subject' teaching, typically by central services staff: may include tailored (subject-specific) tasks or examples
- Literacy provision fully integrated into modules and/or programmes of study, including learning outcomes and assessment: typically in professional/vocational programmes that are already competence-based (but in one case via the tutorial system).

More evidence of outcomes and impact from (1) is likely to come from JISC-funded e-portfolio projects.

Where skills are delivered as separate components (2), there is a danger they will not be seen as central or compulsory elements of the learning experience. Our findings confirm other research that segregating skills is demotivating. While tailored versions of central service workshops are undoubtedly better than no provision, course teams are advised to rethink learning tasks and assessment criteria to give more importance to literacies for life across the curriculum. This is particularly important in a context where fewer students can expect to get jobs that are directly related to their subject of study.

An interesting cluster of 'deeply' embedded examples (3) focused on students rethinking concepts of *space*, and working on the boundaries of real and virtual spaces to express their ideas. This is an exciting development, but we are concerned to find few other examples of radical thinking, e.g. around disrupted concepts of *knowledge, identity* or *practice*. There was also very little evidence in our study of feedback on coursework or assessment being used to support learners' development, e.g. to signpost resources the learner might access or study strategies to practice. The exception was at Oxford University, where subject-specific goals, assignments and feedback are intrinsically linked with personal academic

development through weekly tutorials. Other institutions might well struggle to replicate such a system with larger group sizes and with less self-directed students.

The great majority of our examples across all modes came from vocational and professional courses, and there is plenty of evidence that these are the subjects spearheading support for literacies in the curriculum. In work-based settings, problems are encountered in an authentic setting, their resolution is intrinsically rewarding, and 'competences' are simply aspects of task performance. In formal learning, more effort needs to be taken to ensure there are opportunities for learners to practice and evidence what they can do. This ties in with the recommendations of the Burgess report[1] and the UK Commission for Employment and Skills[2] which emphasise the need for 21st century graduate skills to be integrated into learning activities across the curriculum.

We are aware that much excellent practice in disciplines was not visible to our study methods. Many literacies are so deeply and tacitly embedded in subject teaching that academic staff do not identify their practice as literacy-based at all. Examples might be visual literacies in art, or critical media literacies in media studies. Recognising that different subjects can contribute expertise in different literacies for learning is a first step towards finding and sharing good practice.

One important strength of 'traditional' academic teaching in disciplines is that it recognises learning not as the collection of competences but as the emergence of an identity. Particularly in higher education, learning is about being able to take up a personal stance in relation to subject knowledge and expertise. In a digital age, learners need to practice and experiment with different ways of enacting their identities, and adopt subject positions through different social technologies and media. These opportunities can only be provided by academic staff that are themselves engaged in digital practice.

Learners supporting learners
Social software is now widely being used to enable peer mentoring and group support, for example around skills workshops, during induction and first-semester studies, on placement, and for group work. There is also evidence of the learner voice being captured and shared via videos, blogs and podcasts. Study buddy and student mentor initiatives rarely address digital literacies directly, but could be adapted to do so: student help-desks are common for supporting proficiency with digital devices and networks. All of these approaches are being tried by central service staff with good evidence of success.

Inevitably much peer support takes place under the academic radar, but academic staff can help by being explicit about what kinds of collaboration are appropriate, establishing peer review processes, and setting group assignments.

Problems with current provision for digital literacies include:
- institutional silos, so learners often have several places to seek help with their learning, and cultural differences can make cross-service/dept collaboration difficult
- (often) poor embedding of literacies into the curriculum, particularly at the level of feedback and assessment
- (often) poor integration of information/digital literacies with academic/learning literacies
- curriculum provision tends to be one-off and cohort-based, rather than based on an ethos of personal development: central provision is more personal and developmental but rarely reaches learners when they are actually engaged in authentic tasks
- Academic staff perceive students as being more digitally capable than is really the case
- poor self-evaluation by learners, particularly in relation to their information skills, so voluntary services are not reaching those in most need, and skills modules are not perceived as relevant or important

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1   http://www.universitiesuk.ac.uk/Publications/Documents/Burgess_final.pdf
2   http://www.ukces.org.uk/PDF/UKCES_FullReport_USB_A2020.pdf

Looking to the future: general recommendations

1.Tutors need to be proactive in helping learners to develop learning and digital literacies

The evidence is growing that despite familiarity with personal technologies, learners are generally poor at deploying their digital skills in support of learning. They lack critical media and information literacies, and struggle to translate the capabilities they do have into different contexts. Because of this they remain strongly influenced by their lecturers in the technologies and strategies they use for learning. Tutors' confidence and capacity to be innovative in their use of technologies are critical to learners' development.

2. Learning and digital literacies need to be embedded into the curriculum

Tutors and central service staff, including 'outreach' and hybrid staff such as subject librarians, must work together to embed opportunities for literacy development into the curriculum. To take information literacy as an example, while the first four 'pillars' of SCONUL's information literacy framework deal with generic skills of planning, searching and managing information, the remaining three deal with information in ways that make little sense outside of a curriculum context. 'Compare and evaluate, 'organise, apply and evaluate' and 'synthesise' are all tasks that call on disciplinary means for making and communicating meaning. It could be argued, indeed, that these disciplinary means are what elevate information into useful knowledge. Judith Peacock, a pioneer of integrating academic and information literacies in Australia, has summarised the evidence that information literacy demands *'a fusion of discipline and generic knowledge and skills, [drawing] upon the full potential of problem-based learning experiences and critical thinking development '*(Peacock, 2005).

3. Learners need to be engaged in their own development

The literature on developing effective learners highlights motivation and self-efficacy as key factors. (e.g. Zimmerman). There is now evidence to suggest that separate skills modules undermine motivation. The focus of provision in curricula should therefore be on developing understanding and practice through authentic academic tasks, in digital contexts where appropriate. Assessments must be designed to recognise learners' developing literacies, and feedback must make transparent which strategies lead to success.

Self-efficacy in development can be promoted through timely feedback and regular reviews of progress. Extra-curricular opportunities are important here, including workshops, surgeries, self-study materials and guidance sessions, though some learners will need to be reached pro-actively e.g. by student 'ambassadors' and outreach workers in departments, or on referral from tutors. A deficit model is unhelpful: learners own knowledge practices and study habits need to be acknowledged, while introducing them to a range of successful academic strategies, and the idea of academic communication as taking a stance. Learners benefit from activities such as portfolio building and PDP, which are under their control. Through reflection and practice, skills can become internalised, integrated, and more transferable.

The social aspects of literacy development also need to be acknowledged, for example through peer review, promoting opportunities for peer support, and collaborative tasks.

4. Academic staff need to be engaged in rethinking their own knowledge practices

We have already noted that there are different traditions of meaning-making, and that this might constitute the gap between information and knowledge which learners have to cross if they are to succeed in their chosen subject. The Glasgow Caledonian i-learn strategy expresses this extremely well, calling for students to develop an '*awareness of the provisional nature of knowledge, how knowledge is created, advanced and renewed, and the excitement of developing knowledge*'. But academic staff have few opportunities to reflect on the impact digital technologies are having in their field, and those opportunities which exist e.g. around curriculum (re)validation and review do not always foster an open and enquiring approach.

There are far more examples of embedded practice in professional and vocational subjects, especially where professional bodies are open to exploring how practice in their profession is changing. Less well

embedded are notions of *digital scholarship* – the changing research practices of disciplines and how these need to be reflected in learning tasks and assessments. Disciplines also have ideas to contribute to generic notions of 'digital literacy'. How do specific subject areas make meaning in digital contexts? Analyse and collate data? Innovate (ideas, products, social systems, technologies, interfaces, designs and design protocols)? Think creatively using digital tools? Solve problems of the digital economy and society?

Anecdotally, academics report that learners struggle particularly with tasks of judgement and evaluation, i.e. when they are required to take up a stance in relation to knowledge. This throws up the question of how students develop and manage different identities – including as learners, researchers, professionals, and members of a community – and how they can own their own judgments in an age of shared opinions and 'the power of the crowd'. Other potential clashes of academic and internet knowledge practice are noted below.

Academic knowledge practice	Internet knowledge practice
Individual authority	Shared ownership
The individual occupies a stance/position from which a judgement can be made	The individual is 'a node through which various kinds of message pass' (Lyotard)
Philosophy	Design
Truth value	Use value
Quality of method	Quantity of links/citations/uses
(Disciplinary) tradition of what knowledge matters, and how it comes to mean	The eternal 'now' of what technology makes possible
How I come to know	Who I know
Synthesis (in a dialectical sense)	Aggregation, re-use
Dialogue, disputation	Comment
Discipline/profession as resources (of methods, codes of practice, etc)	Multi-modality, interdisciplinarity as resources
Copyright	Digital commons
Qualification (followed by reputation)	Reputation/recognition first
Research	Problem-solving
Subject knowledge and know-how	Generic skills and aptitudes 'just in time' knowledge and how-how
Text-based communication of ideas	Multiple media used to express ideas
Sharing within scholarly communities, according to established roles and rules	Sharing without boundaries, across ephemeral and unregulated networks

Table.2 potential clashes of academic and internet knowledge practice

5. Information literacy needs to be broadened to include – or needs to be supplemented with - communication and media literacies
The distinction between information and communication technology is becoming less clear, thanks to practices associated with wikis, blogs, social tagging, commenting, file sharing, and online communities. Academic practice is following – and in some instances leading – this trend, so it makes little sense to support information literacies in isolation from these other practices. It is noticeable that use of the term 'digital literacies' is strongly associated with web 2.0 applications in our study, while 'information literacies' is used almost exclusively to refer to digital (content) resources.

The agenda needs to be clearly formulated around informed and *critical* use of technology for learning. SCONUL's fifth pillar, '*the ability to compare and evaluate information obtained from different sources'* seems in Moira Bent's recent review to overlap considerably with what we have called critical or media literacy: '*knowledge about the way the media operate, and certain processes which are particularly important in the academic context, such as peer review of scholarly articles'.* Different disciplines demand proficiency in different (combinations of) media, and create/share meaning in different ways: learners need to both inhabit and critique these modes.

Current information literacy models also tend to assume that academic ideas will be expressed (predominantly) in text. All the background research points to the need for learners to become proficient at creative self expression, and critical argumentation, in a range of media. This presents many challenges, not least in relation to assessment.

In relation to digital technology itself, the point is not to encourage *more technology use* but to encourage more insightful, more reflective and more critical choices about technology and its role in learning.

6. Employability needs to be more carefully and critically defined

Employability at present is very variously interpreted. It appears in many strategies but very few actual interventions in student learning. In some institutions and contexts, 'employability' seems to have given way to the '21st Century Graduate' as a concept, recognising that a college or university education is only the starting point for most graduates, and that employees in high-skill sectors will continue learning (and providing markets for FE and HE provision) throughout their careers.

There is a need for further investigation, and strategic thinking, around:

- economic futures: are we educating students for highly skilled jobs in a global knowledge economy, or are such jobs likely to be in a small minority? In which case, should the curriculum focus more broadly on using ICT critically, confidently, capably, in a wide range of different social and workplace setttings?
- entitlement and diversity: is there just one 'digital literacy' or many? How should a basic entitlement to digital technologies, networks and skills be balanced against individuals' diverse learning pathways and personal preferences?
- citizenship: how students are prepared for a digital society – issues of participation, social justice, personal safety, ethical behaviours, managing identity and reputation – are important as well as how they are prepared for the digital economy
- the role of postgraduate study: does the growth and diversity of the PG market entail a rethinking of the purposes of an undergraduate degree?
- responsiveness: how well and quickly provision can respond to changes in the needs of the digital economy and society
- accreditation: what forms of recording and recognition of achievement are relevant in a digital economy and society?

Again, curriculum teams and professional bodies need to consider what literacies and competences graduates will need, bearing in mind that they are likely to have several careers and that none may be in the field they have studied. They also need to consider what values, identities and attributes uniquely qualify graduates in their field, against a backdrop of change (technologies, learners, markets etc). These need to be reflected in the learning tasks, teaching approaches and assessment regimes of the curriculum, while continuing to be supported by specialist staff e.g. careers, and by cross-cutting processes such as portfolio building and PDP.

7. Summary: Institutional provision should encompass:

- a generic entitlement to access and skills, articulated in terms of ICT support, information literacy, learning opportunities and study skills
- recognition of, and support where appropriate for, for learners' use of personal technologies and

- social networks to support their studies
- clarity about what it means to know, to apply knowledge, to be critical and creative, in different subjects and disciplines, including the impact of digital technologies
- review, feedback and recognition (e.g. assessment) of learners' practices as they develop
- whole-institution, cross-context support for portfolio building so individual learners can integrate these elements – access and skills, subject-specific understanding, and personal practice/know-how – through reflection and planning

Integration cannot be done on behalf of learners, but learners' capacity to integrate their knowledge and skills, to become more confident and self-directed actors in their learning, can be supported:

- Learners can be supported directly through practices of reflection, planning, authentic tasks, a focus on making meaning in specific contexts, and emphasis on their self-efficacy
- Academic staff can rethink the role of the digital across their scholarly and professional practice, and rethink their teaching in light of this
- Staff in departments and services can work as ambassadors and arbitrageurs across organisational boundaries
- Institutions can develop more integrated policies and strategies for learning in a digital age
- Education as a field of study and practice can embrace its own interdisciplinarity and draw on the strengths of related professional and scholarly fields e.g. librarianship, e-learning, learning development, social theory, adult learning, studies of technology and innovation. Digital literacies need to be set against a range of theoretical backgrounds, including learning theory.

Recommendations to the JISC

- Future investigations in this area should focus on institutional and whole-curriculum approaches to embedding digital literacies, and identifying success factors for learners

- Work with HEA Subject Centres to articulate the meaning of digital literacies in different subject areas and to identify 'deeply' embedded exemplars to add to the existing database. Support subject communities to adapt curriculum frameworks and embed new practices around digital literacy, in light of increasing multidisciplinarity and the changing technological and student landscape.

- Build partnerships and channels of communication with staff involved in learning/learner development, who are often at the forefront of the clash in digital knowledge practices, and with whom JISC has little history of engagement

- Build partnerships and channels of communication with careers staff, engaging them with projects across the curriculum (e.g. around e-portfolios, learner records, employer engagement and lifelong learning), as well as CV building and job-seeking.

- Evaluate outputs of lifelong learning projects for evidence of what literacies are of long-term value to learners and other stakeholders

- Work with SCONUL to redevelop/broaden their 7 pillars and ensure JISC community is aware of them and actively embedding and adapting them to institutional need

- Further develop the materials currently available through the LLiDA wiki, particularly:
  - The framework of frameworks as a tool for modelling institutional policy, and/or as an infokit
  - The audit tools and guidance as a resource for institutions, with evidence of their effectiveness as a change process
- Further analysis of rich data from both audit and exemplars of practice
- Discussion around the conclusions and recommendations

- Consider funding pilot projects focusing on:
    - Feedback on assignments as a means of giving personalised guidance and direction learners to personalised support materials
    - Integrating e-portfolio, CV-building, learner records, advice and guidance, around issues of employability or graduate skills
    - How learning pathways e.g. as expressed in e-portfolios or learner records, can intersect with curriculum processes in ways that make the curriculum more sensitive to individual requirements
    - Use of competence-tagging (tagging of learning outcomes AND learner pathways in relation to target competences) for joining up provision across departments and services
    - Communication and media literacies , either treated as an extension of information literacies or as critical skills in their own right
    - Skills required by learners to integrate real and virtual spaces in their understanding of their subject
    - Embedding digital literacies in non-prof/vocational subjects, and/or investigating how literacies are already being deeply/tacitly embedded in these subjects
    - Projects working on boundaries of institutional and personal technologies and how learners negotiate those to create their own learning content